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The Farmer's Digest

Fort Atkinson, Wisconsin

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Coming in March

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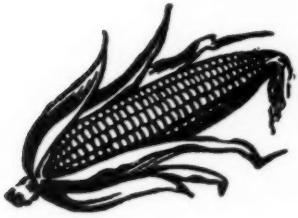
The Farmers Digest

Volume 18 February, 1955 Number 8

HOW DOES WISCONSIN GROW THE COUNTRY'S BEST CORN!



Not Iowa or Illinois, but Wisconsin corn yields top the National average. . .

Condensed from Prairie Farmer

Jim Thomson

IN 1953 Wisconsin farmers led the nation in per-acre corn yields (58.5 bushels). In 1954, they were among the top two or three states. Perhaps to your surprise, they will be ahead of such cornbelt leaders as Illinois, Indiana, and Iowa.

Yet Wisconsin hasn't always been considered seriously as a corn state. How do they manage to get such high average production?

There are some very good reasons, both God-given and man-made. Let's consider what the people of Wisconsin have done to bring this about.

The story goes back a few years to the time E. A. Jorgensen of the extension service came back to the university after growing potatoes on his farm during the summer. He told Dr. Emil Truog, now professor emeritus of soils, that he thought something was wrong when he could raise 600 bushels of potatoes on poor northern soil, while the rich soils of southern Wisconsin didn't average much more than 40 bushels of corn per acre.

Others began to wonder why, too. Then one day Jorgensen asked Truog if farmers could be

Reprinted by permission from Prairie Farmer, Chicago, Illinois, November 6, 1954

furnished with a prescription for growing 100-bushel-an-acre corn. The answer was yes, although Truog offered producers no guarantees.

The idea took root in early 1952 but too late to include very many farmers. However, through the excellent cooperation of county agents and university agronomists, prescriptions were written for about 200 fields. Results were so gratifying (an average of 124 bushels per acre) that it was decided to enlarge the program.

The program blossomed in 1953 as the Pacemaker's Club enrolled some 1,500 fields. Because it was soon realized that many could do better than 100 bushels to the acre, members were given a choice of using a prescription for 100 or 150 bushels. Despite drouthy conditions in some areas in 1953, Pacemaker farmers again averaged over 100 bushels per acre, with yields up to 169 bushels.

How did a farmer get started in the Pacemaker corn project? First of all, he enrolled with his county agent. HE WAS ASKED TO SELECT LAND THAT WAS IN ALFALFA OR CLOVER DURING THE PAST YEAR.

A soil test was required. The method of taking the soil samples was explained in detail. Samples were then sent to the university for analysis where a soils man wrote the prescription for each individual field. On livestock farms allowance was made for manure applications.

The importance of sufficient plant food in the soil to make a 100-bushel corn crop was emphasized by the soils department. It pointed out that a 100-bushel corn crop, including ears and stalks, contains 150 pounds of nitrogen; 25 pounds of phosphorous (P) which is 60 pounds of fertilizer phosphate (P205); and 100 pounds of potassium (K), which is 120 pounds of potash (K20).

Source of Nutrients

These amounts must be obtained by the growing corn from the soil, manure and fertilizer applied, otherwise the 100-bushel corn yield is not possible. However, the calculation is a little complicated because a corn crop cannot in one season take all the available nutrients in the soil or what is applied as manure or fertilizer. On the average, it can get only about 40 percent.

Armed with the fertility prescription, the Pacemaker was then advised that in order to get the most from fertilizer applied to corn, he must have an adequate plant population and proper cultivation. Besides, he learned that the fertilizer had to be applied at the right time and in the right place.

He was advised, for example,

to disk in manure and broadcast fertilizer before plowing. He was also told that starter fertilizer should be applied at about the same depth or lower than the seed. The proper method of side-dressing nitrogen was also explained to every Pacemaker.

The soils department indicated that in order to get the highest yields possible it was necessary to have a plant population of 16,000 to 18,000 plants per acre because 10 to 15 percent of the kernels fail to produce surviving stalks.

Thus, they had to plant about 18,000 to 20,000 kernels per acre. They were also cautioned to drive slowly when planting to avoid skipping and bunching.

Pick Your Own Hybrid

The university did not make the choice of the hybrid, but did say that it was important that the date of maturity of the hybrid be suited to the climate to guard against frost damage.

Weed control was another factor that had to be presented as part of the prescription for 100-bushel corn. Preliminary working at weekly intervals the previous fall and again in the spring with a field cultivator or spring tooth harrow was recommended for fields infested with quackgrass.

If annual weeds are the main problem, the university said, it may be desirable after plowing and seedbed preparation to allow a period of about a week for weeds to emerge. They can then be killed by harrowing just before planting.

Use of chemicals for weed eradication prior to emergence was not recommended entirely, but if attempted, farmers were advised to use one to two pounds per acre. Pre-emergence treatments, it was said, would control annual grasses and most tolerant broadleaf weeds.

Although a relatively small number of Wisconsin farmers took part in the Pacemaker's corn program, the idea received widespread publicity through the press and radio.

Farmers who had neighbors in the Pacemaker Club often checked up to find out how their neighbor Pacemaker was making out. Neighbors were curious to know whether he made over 100 bushels of corn to the acre in a neighborhood where 40 or 50 bushels was the rule. As a result, a great many of them copied the methods of the Pacemaker farmers.

This had a far-reaching effect and had much to do with climbing yields throughout Wisconsin. You can see how this might work when you take the case of John Wengelski who farms 12 miles north of Stevens Point, Wis. From 2.1 acres of Plainfield sand he grew 236 bushels of corn according to the Pace-

maker's formula. This was on land which normally averaged about 35-40 bushels per acre.

About this time, however, there was a great deal of corn in government storage and some Wisconsin newspapers began to criticize the efforts to get higher corn production. Prof. Truog tried to answer these arguments by explaining that farmers were not so much interested in producing more corn as they were in producing corn more economically. This, he said, could only be done by producing more corn per acre.

Corn Costs Per Bushel

Walter Renk of Dane county explained this quite graphically by showing that when he got 168 bushels of corn per acre on one field, his production cost was about 56½ cents per bushel. Renk said that when yields dropped to 117 bushels per acre, the cost of production on that field was 88.3 cents per bushel. Thus, he said, it is difficult to make money with 30 to 40-bushel-an-acre corn. With such low yields you can hardly pay for the costs of production.

Truog also pointed out that high yields encourage conservation of rough land. If you can get level acres, he said, you can leave the rough land in permanent pasture.

He also pointed out that five to 10 years ago Wisconsin had to import $100,000,000 worth of feedstuffs for livestock and that this outgo of wealth from Wisconsin farms has been stopped to some extent by higher production on Wisconsin farms.

Another reason why corn production has climbed steadily is that corn breeders have been more energetic in Wisconsin than in many states in breeding hybrid strains adapted to Wisconsin conditions. N. P. Neal, University of Wisconsin corn breeder, says that 50 to 60 percent of the corn planted in Wisconsin has been bred for Wisconsin conditions.

Neal was not quite sold on the idea of extreme high plant populations per acre. He said that under ideal conditions and high fertility, high corn plant populations may be justified. However, he said, lower fertility levels should take considerably fewer plants per acre.

He pointed out that too high population and close planting results in stalk breaking, lodging, and root diseases which make harvesting difficult.

In 1953, Neal said that of 86 Wisconsin fields producing 125 bushels or more, 54 had less than 17,000 plants per acre. Only 32 had more.

Neal also indicated that close-planted corn often suffers from lack of weed control. The closely intermingled and shallow roots are also vulnerable to too close cultivation.

Another advantage that Wisconsin has is that corn rarely ever follows corn in rotation. However, Truog said that with good management, corn after corn is not objectionable.

Wisconsin also has the advantage of using much more manure than neighboring cornbelt states. Truog pointed out that the value of the manure produced in Wisconsin is close to $100,000,000 per year in phosphate, potash, and nitrogen equivalent, although, he added, half of it doesn't get to where it ought to be.

Dairyman Is Disciplined

Another possible reason for higher corn production in Wisconsin, according to Truog, is that the dairy farmer by nature is a conservative individual. Because of changing situations, he must do all possible under the discipline of high production from both crops and cows to insure himself a good livelihood.

The God-given advantages include the fact that rainfall in Wisconsin is more dependable during the growing season than in many neighboring states.

It has been noted that the high corn production areas in the cornbelt have been moving northward steadily, until they are now thought to have reached a zone running east and west from a point south of the Wisconsin border. It is expected that the higher production areas will continue this northward movement into Wisconsin.

More Wisconsin Daylight

Another advantage which is talked about by soils men, but on which no definte conclusions have been reached, is the effect of longer growing days in Wisconsin than in other cornbelt states. These longer periods of daylight during midsummer are thought to have a desirable effect on the rapid growth of corn.

What's the future of the Pacemaker's Club? Soils men at the university feel that the chief purpose of the Pacemaker idea has been accomplished. More Wisconsin farmers than ever before are now aware of exactly what it takes to get high corn yields. The Pacemaker's Club will continue to spread this knowledge to many more communities throughout Wisconsin. This knowledge, they hope, will continue to filter through to the benefit of a great many more farmers than actually take part in the program.

Want to Work in Town?—Michigan State College says you would need to earn $1.87 an hour, 40 hours a week, 50 weeks a year in a factory to equal a farm job at $200 a month, plus living extras. This equals $354.13 per month in town or $4,249.56 annually.

VETERINARIAN'S NOTEBOOK NO. 12

Little Pigs Need Special Attention

Advice from an English veterinarian gives you the "low-down" on housing, feeding, illnesses. . .

Condensed from Farmer and Stock-Breeder

YOUNG pigs, like young creatures of any kind, are likely to come to grief if they are not properly housed and fed. There are few of the domestic animals which are so sensitive to changes in temperature and changes in diet as the young pig. You may keep literally dozens of young pigs all cooped up in small pens, not strictly divided off from one another in a large, draughty barn and get away with it for years, but there will come a time when you'll wish you had paid just a little more attention to eliminating draughts and providing adequate ventilation and segregation.

Then there are litters of pigs born and reared in a cold, ill-drained sty which never see the sun. The sow never received anything but meal the whole time she was pregnant and never had any exercise. They will be lucky if they grow to maturity without a few of them falling by the wayside.

Mind you it's equally stupid to rear young pigs outside or keep farrowing sows outside in wooden huts in hot summer weather without making provision for shade.

Let's just think of some of the common conditions which kill off young pigs up to 4 months of age. We'll start with the really young and take navel ill. This is a condition which is due to infection of the navel of piglets at the time of birth. They develop swollen joints, a general blood poisoning and die. This disease is always found in dirty, cold, badly drained sites.

Next there is anemia. This occurs in sucking piglets about 3 to 6 weeks old. Instead of being a healthy pink color under

Reprinted by permission from Farmer and Stock-Breeder, London, England

the white parts of the skin, they are a nasty grey shade. Diarrhea is evident and the piglets pant and even collapse after exercise.

This condition occurs commonly in litters of pigs reared indoors whose dams have never been allowed to see the sun or eat green grass. They are short of iron and that's bad.

Influenza occurs commonly in young pigs, from 3 to 20 weeks old, reared indoors in damp, draughty buildings, especially during winter. It is due to a virus, and it spreads like wild fire. Soon the whole lot are coughing, sneezing, and dying with pneumonia. If you get a dose of this it will make you wish you had kept the piglets isolated a little more from one another and given them a bit more warmth. Then there is pneumonia, other than that due to piglet influenza. This again is due to cold and damp.

In pigs from 1 to 4 months old reared indoors, especially in winter months, rickets can be seen. The piglets are lame. Joints are swollen and in some cases the legs are definitely deformed or "bowed." This is due to a lack of vitamin D and calcium. If the sow had been given a properly balanced diet or even addition of minerals such as chalk or limestone to her diet during pregnancy, and cod liver oil, then rickets in the young pigs would have been avoided. In just the same way exposure of the piglets to a little sunshine would perhaps have averted the trouble.

Vitamin A deficiency occurs in the young piglet reared indoors whose dam has never had access to grass or green stuff. The symptoms are unthriftyness, lack of appetite, swaying gait and even convulsions and paralysis. This could be avoided by giving the sow grass, lucerne, silage or any green stuff, and cod-liver oil to the young pigs.

Arthritis in young pigs from 5 to 14 weeks old with its hot, swollen, painful joints and high temperature and death in three or four days is nearly always associated with cold, damp conditions.

Paratyphoid is most commonly seen in pigs up to 22 weeks old kept in damp, cold, unhygienic houses during the winter months. It is often associated with anemia and piglet influenza and outdoor rearing, warm, dry pens and the provision of fresh ground can considerably lessen the incidence of this disease.

The pig is a clean animal given the chance to be so. If you will provide adequate space and a warm, dry bed then the sow will not foul the bedding and the young piglets will not be shivering in wet straw. If the pen is damp then raise the bed on sleepers or planks. If the

rain is blowing in through the front of the farrowing pen then nail a sack across. Warmth is essential.

If you expect a sow to produce a healthy litter of eight pigs or over, then it stands to reason that you have got to provide her with more vitamins and minerals than she normally receives.

"A farmer has to be economist enough to know when to buy and when to sell, and bookkeeper enough to know where he's making and where he's losing money. He has to be engineer enough to run $10,000 worth of farm machinery, and mechanic enough to fix it when it breaks down.

"He's a gambler on weather and prices. He's a veterinarian and he looks for disease. He's a diplomat, weatherman, agronomist, and entomologist.

"He has to be a jack of all trades—and master of all."

Secretary of Agriculture, Ezra Taft Benson

Clipped Cows Clean Up Milk

"Butch" haircuts on dairy cows make sense if the haircut is in the right place, reports W. R. Van Sant, University of Arizona.

Cleaner milk is the reason for clipping the hair from a cow's udder and hind-quarters. Dirt collects in this long hair and falls down into the milk, causing milk sediment. Clipping keeps your dairy herd cleaner and cuts down the chances of dirty milk.

Clipping saves time and labor, too. You can clean off a clipped cow faster and with a lot less effort just before milking than you can a cow that isn't clipped. The clipped cow just isn't as dirty to begin with. Long hair growing on the udder, flanks, and udderline is a collecting place for dirt, filth, and bacteria. No matter if you're using milking machines or milking by hand, clipping makes a big difference in cleaning up your milk.

In clipping the dairy cow, begin at the tailhead, clip around the base of her tail, and cut her switch off about four inches from the floor. Work on the udder next. Take off all the long hairs, especially those growing on the rear udder attachment. Clip the belly and hocks. Then, finish the job by clipping the flanks and hindquarters.

By doing this, the cow's udder and milking region stays cleaner longer, you save about 10 percent of your time in cleaning her before milking, and the quality of your milk goes up.

Arizona Extension

Artificial Breeding vs. Natural Service with Dairy Cattle

What does experience show as to success of each method. . .

Condensed from What's New in Farm Science

E. L. Corley and E. E. Heizer

WHAT has artificial breeding done to milk and butterfat production?

That question has come from farmers ever since artificial breeding associations were organized in 1939. They want to know whether artificially sired cows produce more milk than naturally sired cows. There are figures available from the Dairy Herd Improvement Association (DHIA), but these "raw" figures don't give a true comparison, Experiment Station breeding specialists say.

E. L. Corley and E. E. Heizer made certain adjustments in the DHIA records of cows calving in 1952, so as to place artificially sired cows and natural service cows on a more equal footing for comparison purposes.

According to the raw figures, Wisconsin "artificials" in DHIA records are better than all DHIA cows by 1,422 pounds of milk and 51 pounds of butterfat per year. A better comparison, the specialists say, would narrow the gap considerably—with "artificials" topping "naturals" by 492 pounds of milk and 14 pounds of butterfat.

The researchers say that the "raw" figures needed adjustment because they weren't collected in the same way. Figures for "all DHIA cows" are actual herd averages for an entire year. The figures for "DHIA artificials", on the other hand, are adjusted to a mature equivalent (calculated production of a 6 to 8 year-old cow) milked twice a day for 305 days. This gives the

Reprinted from "What's New in Farm Science", Bulletin 511,
Agricultural Experiment Station, University of Wisconsin, Madison, Wisconsin

"artificials" considerable advantage.

When Corley and Heizer recalculated the records of all DHIA cows on the same basis as the "artificials", the difference narrowed to 399 pounds of milk, 9 pounds of butterfat in favor of the "artificials". But that, too, didn't give a realistic picture. Two more adjustments had to be made before the researchers arrived at what they considered a true comparison.

About 10% of the records in the "all DHIA" group were from the 4,247 "artificials" in the state. When the researchers removed records of "artificials" from the "all DHIA" records, "artificials" gained a little—averaging 410 pounds of milk, 11 pounds of butterfat better than the natural service DHIA cows.

An adjustment to equalize the percentage of grade cows in each group also boosted the difference in favor of the "artificials". More than one-third of the cows in the "artificial" group were grade cows, compared to less than one-fourth of the 37,515 cows in the natural service group.

This adjustment brings the artificial service cows up to 493 pounds of milk and 14 pounds of butterfat better than the natural service cows. This, the researchers think, is the best comparison now available. According to the adjusted records, the "artificials" produced 10,709 pounds of 3.8% milk (405 pounds of butterfat). The "natural service" cows produced 10,216 pounds of 3.8% milk (319 pounds of butterfat).

Summarizing, the researchers say "raw" DHIA figures shouldn't be used to compare cows produced by artificial breeding with cows produced by natural breeding because the figures have been collected differently. They've made three adjustments:

1) Changed DHIA records to mature equivalent, 305 days production.

2) removed records of "artificials" from the "all DHIA" records to leave only natural servive cows in this group, and

3) adjusted for the effect of the larger proportion of grade cows in the "artificial" group.

After these three adjustments, they get a truer picture of the effects of artificial breeding on milk and butterfat production.

Lice and Mites on Hogs Reduce Gains. You can easily get rid of such pests by using chlordane, B.H.C. or lindane. Dust or spray both the pigs and the bedding.

Do-Well Agricultural Service

PENCIL-PACKING COWMAN

Is production testing for you? This commercial stockman thought it strictly for purebred breeders. Now, he's satisfied it's his best bet to stay on top. . .

Condensed from Farm Journal

A. S. Bledsoe, Manager, the Flying B Ranch, Washington

UNTIL we tried production testing, I was just another range stockman who thought it was just something else for the purebred boys to play with.

But we've been at it four years now with our herd of 340 commercial Angus cows, and I've changed my mind. On a typical Central Washington range setup we've learned that production testing doesn't take much extra work. In fact, profits far outweigh what little trouble and attention is required. Because in four years we've:

- Boosted our calving percentage from 86% to 97%.
- Added an average of 35 pounds to our weaning weights.
- Gained 82 pounds of beef per cow to push across the scales.
- Added $21 per cow to our income.

In times like these, in the beef business, you can't laugh off figures like that. Oddly enough, we got our eye-opener back in the days of 36-cent to 40-cent-a-pound calves. Stockmen were making money then, but even so our income wasn't what it should have been. Our best customer, the housewife, was balking at the price of beef.

So we did the instinctive thing—cut expenses. We consolidated insurance, we made quantity purchases, we produced our own milk, eggs, meat and vegetables, we changed from a cash to an accrual bookkeeping system, and we started writing letters instead of calling long-distance. With these and other savings, we whittled our costs down 16%.

But it was only a stop-gap. Our break-even point was still too high to ride out a real price squeeze.

Right about here, I cried on the shoulder of Charlie Kyd,

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania, December 1954

our Extension animal husbandman at Washington State College. When he learned what our calving percentage was, and that we were turning off 430 pound weaners, he said—and I'll never forget his words:

"Stew, your problem is simple. Fourteen cows out of every hundred aren't doing anything for you, and the ones that are bringing in a calf are doing only half a job.

"Now, if you culled out all the drys, and replaced them with heifers out of your best producing cows, you could change the picture pretty fast. Naturally, you'll have to buy good bulls to sire those replacements."

I was fresh out of college, and there was one drawback, mostly personal. "Just supposing," I said, "that the cattle all look alike, and I can't tell for sure which calves came from what cows—what then?"

With that, Charlie and I talked through the evening, and into the early morning hours. And while we have tinkered with it some, what we came up with is the production testing system we've been using ever since.

It calls for identifying our calves. That's so we can check them closely, make accurate daily rate of gain comparisons at weaning time, just like the purebred breeders do.

Each of our calves "wears" his birthday on an ear. We use numbered ear tags, but you'd need pretty sharp eyes to read those numbers from the back of a horse. So we have a wrinkle that overcomes this:

We divide the two months when we want our calves to arrive—February 15 to April 15—into four two-week periods.

Calves that are dropped before the end of February have the tag placed on the upper side of their left ear. Then, to show March 1 to March 15 birth dates, we use the ear underside. It works the same way for the month following, by using the right ear. This way, we check calves closely during the time they're nursing, and at weaning and weighing day, we're not comparing early calves with smaller, late arrivals.

We're not running a fancy purebred outfit, so we figure that pinning down a calf's birthday within two weeks is close enough for us.

It's those early calves that we're after. Already, we're learning that cows that calve early tend to do so every year, giving us 50 pounds of extra beef in the process. So the ear tagging system fits nicely into our culling program.

We identify our cows, too, of course. That's easy—with number brands high on each one's right shoulder. We use the last

digit of a cow's birth year, as well as an individual number. In our permanent record book, each cow has a page of her own.

The first year we trailed that marked-up bunch of cows to summer range, I was on the receiving end of a good many wisecracks.

But shoulder brands pan out better than either tattoos or neck chains. We can read them easily from horseback, and once branded, it's on to stay.

During the winter months, we want to ready 'em especially at calving. So in January we run the cows through a chute to clip haired-over numbers.

Each of us who works the herd carries a pocket-size notebook. We continually jot down information that affects production from each cow. After supper, that information goes onto the individual record sheets. Some of the things we're on the lookout for and record are these:

Cows that graze well on hot days, cows that crawl fences, those non-settling on the first heat period, good milkers and bad, ease of c a l v i n g — and "trouble cows" of all kinds. It doesn't take long to 'peg the bad actors.

At weaning time, we weigh calves individually, and compute daily rate of gain. That goes into our records too.

There's more to our system than merely d e t e r m i n i n g weight. We also grade our calves for type. Our County Extension Agent, Phil Bloom, has the reason when he says: "If weight alone is what you want, you'd better concentrate on Holstein steers."

We're just like any other cattle outfit in not wanting to send typy animals down the road. But cow No. 124 cured us of being chicken-hearted. She was the kind of smooth-bodied cow that any purebred breeder would have been proud to own. Trouble was, we didn't believe our own records when she turned out a first calf that weighed only 385 pounds. So we b o a r d e d her another year. Darned if she didn't do it again.

Today, we beef our cows for the following reasons, and in this order:

1. Drys. Each cow moves the scale beam every year. If she hasn't a calf to sell or keep, then she climbs on herself.

2. Sorry milkers. The record system sure weeds out the fat-cow-lean-calf combinations. We figure 60% of a calf's weight at weaning time reflects the milking ability of the cow.

3. Late calvers. Once late, always late, is the way it works out for us. So we're now removing bulls at 115 days instead of 150 days, as we used to do.

4. Old cows. After eight years, we watch 'em closely. A calf weighing below her average is a cow's last one for us.

5. Fighters. The meaner they are the sooner they go. Two of us can now handle our herd easily, while four years ago it took as many as four.

6. Off-types. Our type is a cow that has size, spring of rib, and heart girth, because we're finding that they have the doing ability we're after.

Bulls? First, they must grade 2 or better, and now that figures are available, we aren't buying anything that hasn't shown at least a gain of 2.15 pounds a day on production test. When it comes to a showdown between show ring type vs. bone and scale, we take the latter every time.

When our purebred bulls come to us highly fitted, we let them down carefully to our standard bull wintering ration —all the bright, leafy alfalfa they'll eat. But no grain.

We've started checking out new bulls on a bunch of heifers, before they go on full duty. This way, we catch any that sire doggy calves, before they do too much damage.

Before they are in the herd for keeps, we take three cuts at our replacement heifers. The real misfits are dropped at the weaning weigh-off, and a second weighing after the first winter catches some more. Then we take another look when they bring in their first calf.

When we got the system underway, our idea was to upgrade the cattle. It didn't take long before we found that there was at least one extra big dividend—management.

We never have any more orphan calves. Calving has become almost trouble-free, and work goes along more efficiently, especially with new help.

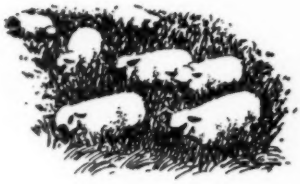
Here's an example of what I mean. We like to creep-feed steer calves that will be going into a feed lot. On the other hand, there's no point in putting grain into heifer calves that we'd rather have come along at a slower pace.

With our herd, it used to mean two days to work out the steers and their mothers. Today we can do the job in a short half day, with time to spare.

Although there have been days when our note-taking looked like extra labor, we wouldn't go back to our old hit-and-miss system for anything. We can't afford to.

Cash outlays for soil and water conservation can be charged as farm expense—rather than farm capital—under recent changes in the Internal Revenue Code, making them income tax deductible. Detailed information on the changes may be obtained from Internal Revenue representatives.

No Major Change for Lamb Producers



An expert on marketing presents his opinions on the future of sheep production in the coming year. . .

Condensed from The Ohio Farmer

Gilbert Gusler

RETURNS to producers from lambs promise no major change in the year ahead. Growers may do a little better but finishers are not likely to do quite so well as last season.

Total market supplies of lambs may be slightly larger. Other meats and poultry will continue plentiful. Consumer buying power probably will hold near current levels. The general average of lamb prices may not differ greatly from that in the past year. Production costs probably will average about the same. Flock owners will get a slightly larger return from wool through the production incentive payment which will be reflected also in pelt values and in prices for lambs.

This year's lamb crop of 20,170,000 head was three per cent larger than last year's in spite of a drop of two per cent in ewe flocks. The percentage lamb crop at 94 was the highest on record. The crop has increased in each of the last four years, but this year's was only 2.3 million head more than at the low in 1950 and was 12.4 million less than the 1941 peak. Allowing for the increase in number of consumers, they will have only a smidgen more lamb on their plates than in the last past three or four years and considerably less than a dozen years ago.

Demand for breeding sheep has not been especially brisk, but probably will get some encouragement from the wool production incentive payment.

Three years ago, lambs were high compared with the general level of prices of farm products. Farmers and ranchers began to increase sheep flocks, but the

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio, October 16, 1954

expansion did not go far or last long. Now, lamb prices are near their long-run average relationship to other farm prices, so there is no strong price incentive to go into or out of sheep. Lamb prices gained on beef cattle prices in the last three years but are still somewhat below their 40-year average relationship.

With little change likely in numbers of stock sheep, the change in next year's lamb crop will depend greatly on the lambing percentage which might be less than the record high of this year. However, any decline is likely to be small unless weather is extremely unfavorable during the lambing season.

Slaughter supplies in the first four or five months of 1955 will depend greatly on the number of lambs and sheep on feed on January 1. A small increase in feeding over last year seems rather likely.

Lamb finishers had greater than usual profits last season. Feeder lambs were laid in at an average cost of about $17 a cwt., Omaha basis. Cost of putting on a 25-pound gain at Corn Belt average farm prices for corn and alfalfa hay was about $5.10. Fat lambs brought an average of slightly over $22 a cwt. in the December-March fed lamb season.

On the basis of those figures, finishers had a gross margin of around $3.40 a head for making a 65-pound feeder into a 90-pound fat lamb. This compared with only $1.13 calculated on the same basis in the previous season and a 10-year average of about $2.60.

With a good season behind them and good feed crops in many Corn Belt feeding areas, finishers have been buying feeder lambs 50 cents to $1 a cwt. higher than last fall.

Feed costs may average slightly higher this season. Corn and hay crops are smaller. Much of the corn carryover is owned or controlled by the government and the larger pig crop will increase farm use of corn. However, any change in feed costs will be small. Total production of all feed grains is about two per cent larger than last year.

While the cost of producing a fed lamb will average higher this season, prices for them next winter are likely to average slightly lower than last winter. Supplies of other meats will be larger and their prices lower. Hence, finishers' margins are likely to be smaller than last season, but they may still be fairly good.

Looking beyond next year, earnings from lambs may stabilize near present levels. Heavy slaughter of cattle and calves and large commercial broiler supplies will tend to hold down lamb prices, although they will

continue higher relative to cattle than two or three years ago. Lamb production may expand slightly because of diversion of acreage from controlled crops to pasture and hay, but it will remain much below the levels of 12 to 15 years ago. Cattle will still have the preference except on pastures and ranges best utilized by sheep.

Is this a good time to start a flock?

Costs of breeding stock are down, hence, it is a better time than if there were a general scramble to get into sheep. Lamb prices in the next few years probably will be near their long-term average relative to prices for other farm products. For those who like sheep and who have the labor and skill, a sideline flock or a larger one probably will be moderately profitable.

If lamb prices should stabilize near the levels of the last year or two, it will still be possible to raise net earnings through lower costs. Some basic things in low-cost production of lambs are:

A high percentage lamb crop of fast-growing lambs. That requires careful selection of ewes, flushing at mating time, use of vigorous rams and close attention at lambing time.

Breeding for early lambs where feed and facilities permit and creep feeding to get to market when prices are high.

Docking and castrating lambs at not over three weeks of age to raise market quality and avoid price discounts.

Providing long-season pastures to reduce cost of feeding and labor.

Control of parasites and diseases by medication, clean quarters and rotation of pastures to reduce death losses and permit fast gains.

Using caution in buying feeder lambs, taking them when markets are glutted rather than when prices are zooming and buying native feeders rather than westerns when the price difference more than offsets the increased risk.

Grazing down the cost of feeders where feasible, using stubble pastures and cheap fall roughage.

Avoid crowding too fast on feed and vaccinating for "overeating disease" if self-feeders are used.

Kill Poison Ivy—If poison ivy is mixed in with delicate plants, you can use a weed-killing chemical called Ammate. George Berggren, Penn State extension agronomist, says the material will kill poison ivy quickly, often within a week, and will not harm surrounding nonpoisonous plants.

Pennsylvania State College of Agriculture

Strip Grazing

This California dairyman grazes nearly 3 cows to the acre on a small planting of alfalfa. . .

Condensed from Western Dairy Journal

Raymond Coppock

BY supercharging the technique of strip grazing, a dairyman from Madera County in California's central valley says he's found the secret of getting most of the advantages of green-chopped forage with practically none of the cost.

Young dairyman Myron Pierson of Chowchilla, starting out with only 18½ acres of cropland, obviously had neither the acreage nor the herd to justify green-chopping equipment. But that same small acreage made it vital for him to get the highest possible forage production per acre.

Here's his answer, he pastures alfalfa in tiny strips, moving his portable fence no less than three times a day.

Cheap Green Feed. Says B. L. Jacobs, Madera County farm advisor for dairying: "I'm convinced that this is the answer for a small operator who wants to get green feed without high cost. And it looks to me as if this would work well for larger herds, too."

Pierson's total herd—31 cows—is pastured on about 12 acres of alfalfa. The field is divided into six long strips, 50 feet wide, with a permanent electric fence down every other dike. At about 9 o'clock in the morning and 1 and 6 o'clock in the afternoon, Pierson simply unhooks a single 50-foot cross-wire with a light metal stake in the center and moves it 120 feet down the strip. Total labor time, including walking to and from the field: about half an hour a day.

The cows, naturally, move right into the fresh forage and slip off the succulent tops. Then, with several hours to go before another move, they work on the leafy stems. By the time

Reprinted by permission from Western Dairy Journal, Union Stock Yards, Los Angeles, California, July 1954

the next strip is opened, the alfalfa is down to six or eight inches, largely stems.

Stable Production. There is, naturally, some trampling of the alfalfa, although most of that crushed in the first minutes is picked up and eaten. This brings up a basic question: how long should the cows be left on one strip?

Pierson has found that the timing of his system is a compromise—the cows are left long enough to eat the tops and a good part of the stems (he's never had a case of bloat), but they are moved on before forage gets scarce enough to lower milk production.

"As long as I keep them moving regularly, production stays up," says Pierson. "But once I tried holding them long enough to clip the stems well down. Production dropped half a can for 27 milking cows."

Stems No Worry. Two more points: 1. The stems aren't entirely wasted. They're tall enough to shortly fall over and rot — and Pierson's ex-cotton land can use that humus.

2. Most of the protein and other nutrients are in the tops and the leaves, which the cows get. This protein-rich feed probably means less money spent on concentrates. (Pierson's alfalfa recently tested 24.41% total protein on a green basis.)

All of these points are secondary, of course, to the one thing that bothers many dairymen about alfalfa pasture—the danger of bloat. But Pierson's bloat-free record indicates that his cows are getting enough of the roughage to eliminate that danger.

Number of Cows. A problem related to timing of the grazing is the number of cows on the pasture. Pierson has about two and two-thirds head per acre, and believes that is about the pasture's capacity.

By fertilizing with 150 lb. of super-phosphate per acre, he gets only slightly better than average alfalfa production, six and a half or seven tons per year on a dry basis. However, eight or nine tons aren't unusual in his area, and when his land recovers more from cotton cropping he may be able to increase his herd.

Pierson makes hay from part of his alfalfa acreage, and buys hay and silage for winter feeding. However, his alfalfa pasture lasts between 9 and 10 months. "We pasture off the last cutting on the hay field," he says. "Between that and the regular pasture, there's enough green, succulent feed during the fall to stimulate production, at least."

He supplements with dry hay all year, giving four bales daily to the herd even at the height of the growing season.

Irrigation. Here are more aspects of Pierson's setup: With underground pipe to the head of each check, he can water different parts of the field at the same time, skipping around the grazing herd according to his needs. Ordinarily, he puts the water on a two-check strip as soon as the cows move off.

Cost — total investment in electric fence is $55. No other equipment is needed.

Labor—only a few minutes three times a day. Despite the popular idea that fence-moving is one of the big problems of strip-grazing, Pierson's experience with a greatly speeded-up operation shows it doesn't have to be.

Pierson's system appears to be a compromise between green-chopping and straight pasturing of alfalfa. First, although his cows get all the green forage they can handle, their intake can be closely controlled to eliminate bloat and make the most economical use of succulent tops and less-rich stems. Second (and here's the clincher for small dairymen), the cost is so small it practically isn't there.

Vaccination of Poultry Made Easy

You may not need to handle each of your chickens to vaccinate them.

You may simply put the vaccine in their drinking water or dust the dried vaccine over the chickens with an ordinary hand duster. Those are two new developments that soon will be available, according to Dr. S. C. Schmittle, Michigan poultry disease specialist.

The drinking water vaccine is designed only to prevent Newcastle disease at present. But Dr. Salisbury's Laboratories announces that it soon will be available for infectious bronchitis. Tests at the Storrs Agricultural Experiment Station in Connecticut shows this vaccine offers promise.

The dust vaccine works in much the same way as one dropped into the chickens' nostrils. Dr. Schmittle points out that it may not be necessary to get dust on each bird for the vaccination to take effect—the chickens breathe in the material.

This vaccine, designed for use against both Newcastle disease and infectious bronchitis, will soon be released by Lederle Laboratories. Dr. Schmittle says that the easy methods of vaccination may revolutionize the process. But, he adds, only widespread use will tell how they compare with the present individual bird handling methods. *Michigan State College*

The New Type of Rural Community

The great migration of non-commercial and part-time farmers to the country has created many problems. . .

Condensed from The Michigan Farmer
Fred Trump

AT Michigan State College for its 33rd annual conference, the American Country Life Association recently sought answers to what is probably the most complex and troubling problem facing the rural community today—the mass movement of city-employed people to the country.

"The rural community is changing. The impact of the industrial revolution has come to the doorstep of almost every farmer in America," said Paul Miller, MSC rural sociologist.

With great migrations of non-commercial farmers and non-farmers to the country must come a new relation of man to land use, he said. Schools, churches and other services need to adjust to these changing needs. One of the greatest needs, Miller said, is for understanding and cooperation between the newcomers and the old-time residents in the new rural community. In many cases the community has already become "rurban," a combination of rural and urban.

Louis Wolfanger, MSC land use researcher, pointed out that already more people in Michigan live in "rurban" areas than in strictly rural areas. Land has been badly used in "rurban" areas in the past, but much can yet be done to apply good land use to "rurban" development, he stated. On a tour of nearby Meridian Township, Wolfanger pointed out some good examples of "rurban" planning and many examples of lack of planning.

Plan Land Use

Wolfanger suggested that townships make careful, long-range plans as to the geographical location of future "rurban" growth. By zoning, or otherwise, farmers should be encouraged to keep the best farming land in agriculture as long as possible.

Reprinted by permission from The Michigan Farmer, Detroit, Michigan, October 2, 1954

This is so that food production can keep up with the fast-growing U. S. population, and so that enough trained young people will want to stay in farming. The pressure of "rurban" growth should be directed to the poorer land, especially on sandy soil where drainage is good, he said. One of the problems seen on the tour was that of poor drainage, which makes for wet basements, poor sewage disposal and unstable houses. Some land, which makes suitable farm land when properly drained, causes problems when heavy "rurban" growth occurs on it.

Another problem noted was that of scattered "rurban" growth that makes too costly central water or sewage systems. Traffic safety is less a problem where a "rurban" center develops on one or more side roads rather than along a heavily-traveled highway. Wolfanger also stressed better planning of game and water resources, such as proper spacing of houses around a lake and keeping water safe for swimming. Lack of planning was seen in a junkyard on a main road to MSC and in a drive-in theatre in a hazardous spot along a busy highway. An idea of the change needed in services in a rural community was seen in a 950-pupil school. Next year that school will have an enrollment of 2,000.

Joseph Ackerman, Farm Foundation, Chicago, pointed out that improvements in the changing rural community must come from the people themselves. Rural health centers and hospitals paid for by rural people have attracted good doctors. He felt that the church should be the main influence in the new community. The employment of rural secretaries by the denomination or diocese is needed. The rural minister should be a specialist in rural life, said Rev. M. L. Bomhoff, Flanagan, Illinois.

"Schools also should do much to bring together old farm communities and booming suburban areas," said William Robinson, Western Michigan College rural educator. He noted that many rural schools can afford better living conditions for teachers. The new community should encourage teachers to live in the community, he said.

Youth programs need better planning so that rural and "rurban" people can live more in harmony, said E. W. Aiton, USDA Extension Service youth program director. Paul Johnson, Chicago, association president, felt that youth programs such as 4-H were a major reason for the mass movement of city people to the country.

Marriage Conflicts

Christine Hillman, Ohio State University home economist, found in a survey that more and more rural youth are selecting

urban mates. Many of these marriages are not successful. Surveyed were full-time farmers and their wives, who were all under 30 years old and who had been married from one to 5 years. All of the men wanted to stay on the farm, but 23 per cent of the wives did not. Some 39 per cent of the farm wives had never lived on a farm before.

Few of the women had any home economics training, and many of the city girls said this increased disunity in the home. Management of the home and of farm finances were big problems. Most of the women wanted to learn how to run their homes better, and wanted to learn in groups and with recreation. Young couples felt out of place in community meetings, for they felt the meetings were run entirely by and for older people. Added problems were the cost of getting started in farming, and of getting credit and enough acreage.

In another important area of "rurban" growth—public health—Dr. Albert Heustis, state health commissioner, pointed out that preventing health problems is less costly than curing them. That means advance planning. The sanitary land-fill, if managed right, is the most economical and effective means of garbage disposal, he said.

Impact of TV

"Young families moving to rural areas still have close ties to the city. Communications through radio, press and meetings can do much to help these people adjust to the rural community," said William Ward, Cornell University extension editor. Despite the same number of extension meetings in the U. S., attendance has dropped since 1951. He suggested several reasons: too many meetings; "the same old speakers"; and the formality of some meetings.

But a major cause is the impact of television, he said. Nor has the full impact yet been felt. New York county agents found they could not compete with TV fight nights. Homemaking and adult education groups had similar problems. A survey in one New York county showed that television had replaced half of the social contacts of 52 per cent of the farmers. For 12 per cent of the farmers television had replaced all of their social contacts. He added that television has actually increased reading, and that the written word will continue to have great influence.

Aid Low Income Farms

"Problems of the Low Income Farmers and How They May Be Met," was the topic of Don Paarlberg, assistant to the U. S. Secretary of Agriculture. "Poverty begets an economic social pattern that begets more poverty," he said, "and people take

less part in community, religious and civic affairs. In 1949, he pointed out, 40 per cent of our 5,400,000 farm families had family cash incomes under $2,000.

The causes of low income farms are unproductive land, not enough capital, poor education and a high birth rate. The birth rate and the agricultural revolution mean that half of our rural young people must find work off the farm, he said. Many of them do not want to leave the farm. Thus piling up occurs that leads to low income per person.

In a study under way by USDA, it is proposed that these people be better informed of opportunities in and out of agriculture, and be better equipped to seize these opportunities. "However these complex problems are attacked, the promise of success is greatest when the programs have a strong flavor of state and local participation," he said.

"Agricultural research and extension have been chiefly directed toward larger farms. It is easier to work with these farms, and spending of public funds brings more visible results," he said. "But there is a need for working with the smaller, low income farms."

Some proposals include: developing fair leasing arrangements; voluntary farm and home planning; nutrition education; supplying private and public credit, along with farm management guidance; providing better services to hired men and migrants.

Many of these ideas apply to part-time farmers also. Much guidance can be given to these people to help them adjust, if they so desire, to full-time farming or to other occupations. Vocational education can help train young people for farming or trades.

The small tractor with its full line of equipment, the Farmers Home Administration and REA have helped the low income farmer. But these people still face great obstacles. Their problems are complex, and thus attract little interest. Often commercial farmers are not enthusiastic about technical help given to these smaller farmers. Organized labor often does not welcome these people going into industry in the city, and some farmers resist industrial growth out in areas where these low income farmers live.

Dairy products, more than any other foods, help to make the United States the best fed nation in the world. And dollar for dollar, they're the best buy in the housewife's daily food basket.

A FARM SHOP PAYS DIVIDENDS

You need tools and equipment on the farm. . .

Condensed from Missouri Farm News Service

J. S. McKibbin, Agricultural Engineer

A farm shop, or maintenance station, regardless of what it is called, has a definite function on the modern mechanized farm, says J. S. McKibben, agricultural engineer at the University of Missouri. The many specialized machines required to efficiently operate today's farm need to be serviced, adjusted, repaired and specially equipped for many jobs.

A building, in which any of the machines on the farm may be driven or pulled into, located near, or on, the main traveled lines between farmstead and fields, will be well suited for a service center.

The service center should be so located and constructed that it will be the natural place to take all machines to perform service operations.

Certainly the building should be large enough to accommodate all needed shop tools and equipment and still have ample room around large machines for all service operations without crowding.

Possibly the most important single article of equipment for the service center is a convenient space heater. If the building can easily be made comfortable during bad weather, service operations can be performed that otherwise would either go undone or would be performed in the field during valuable hours.

Other tools and equipment for a worthwhile service center may vary from a few hand tools to a complete list of hand and power tools, depending principally on desires, needs and mechanical ability of the individual farmer or his help.

A list of some of the more important items are as follows: A good accessible building with ample floor and entry size; convenient space heater; complete assortment of good hand tools; power grinder; hand electric drill with a bench mounted press; air compressor; good lubrication equipment; coal or gas

Reprinted by permission from Missouri Farm News Service

forge; anvil and forging equipment; and welding equipment.

The list might go on and on through a long array of tools and equipment that would be useful. A good, comfortable shop building with a modest list of tools will, in general, be more valuable to the farm business than a small, poorly suited building even though it is ever so well equipped.

A comfortable shop not only makes possible utilization of time during bad weather with an equal or greater saving of more valuable time in the field when the machine is used, but may add many years to the life of the machine as well as to reduce the yearly repair cost.

Considering the number of expensive machines on farms, the high cost of labor during peak seasons and the loss that may occur from delayed harvest, the service center can frequently spell the difference between profit and loss in the record book for many of the less profitable years of a farming business.

Small Towns—The Answer

Small towns are the answer to country living with city conveniences. And millions of Americans are taking advantage of the situation.

It's due to a compromise of two basic American values, according to A. F. Wileden, rural sociologist at the University of Wisconsin. He says it's the rural virtues from early settlement days mixed with the modern efficiency borrowed from city bigness that makes small town living so popular.

Wileden says people today are seeking fresh air and sunshine, grass, and a garden, along with a safe water supply, fire and police protection, and all the other modern conveniences city people are accustomed to.

This desire is evident in a mass movement to "fringe" areas of the bigger cities. Between 1940 and 1950 the American nonfarm population increased 43 per cent. During the same period big city population increased only 19 per cent, and farm population decreased 24 per cent.

But at the same time, some small towns are losing out. About half of Wisconsin's counties are steadily declining in population, while about one-half are gaining numbers.

Some people are bound to be hurt in the shift. But Wileden feels these unavoidable adjustments will make for stronger, though fewer, small towns in the future.

Wisconsin Agricultural Extension

WHAT FEEDS ARE "MUSTS" FOR EARLY WEANING OF PIGS

The University of Minnesota shows results on weaning pigs at three and eight weeks. . .

Condensed from Successful Farming

Harold Swanson

IMPORTANT feeding trials with early-weaned pigs were recently completed at the University of Minnesota. Results tell us what feeds are necessary for pigs from 3 to 8 weeks of age.

Over 500 pigs were included in trials directed by L. E. Swanson, professor of animal husbandry.

One part of the trials involved 200 pigs and showed that pigs weaned at 3 weeks gained as rapidly and efficiently as those weaned at 8 weeks up to the time both groups were 8 weeks old. After 8 weeks, the early-weaned pigs fall about 10 pounds behind the pigs weaned at 8 weeks.

A second part of the trials included 329 pigs weaned at 3 weeks and fed various rations to 8 weeks. Variations from a basic ration were made to test individual feed ingredients.

The basic rations included 47 percent ground corn, 10 percent sugar, 16 percent soybean oil meal, 11.9 percent dried skim milk, 8 percent tankage, 5.1 percent lard lecithin, .5 percent steamed bonemeal, .5 percent trace mineralized salt, 1 percent vitamin premix, and 2 grams aureomycin per 100 pounds.

Trial results using variations of this basic ration showed:

1. A 20-per-cent-protein ration is best for pigs from 3 to 8 weeks of age. Other rations tested were 16, 24, and 28 percent protein.

2. Aureomycin, procaine penicillin, or arsanilic acid increases the rate of gain markedly but

Reprinted by permission from Successful Farming, Des Moines, Iowa

doesn't affect the feed efficiency. The arsanilic acid was not toxic in tests.

3. Adding "molasses fortifier" or "anise-molasses" doesn't improve rate of gain or feed efficiency. Besides, pigs preferred unflavored feed to these.

4. Although the pigs preferred sweeter rations (18 percent sugar), neither sugar, nor dried molasses, nor saccharin helped the rate or efficiency of gain. Pigs preferred 10-percent-sugar rations to those with 5 percent sugar, no sugar, or saccharin.

5. Substituting dried, condensed fish solubles for part of the tankage improved the ration. Average daily gain was higher—.82 to .71 pound, and feed needed per pound of gain was less—1.98 to 2.2.

6. Substituting rolled oats for 40 percent of the corn didn't help the ration. These results were contrary to what was expected and this test will be repeated.

7. Fat in the ration in the form of lard lecithin made little difference in test results. In one trial with fat added, pigs averaged 35.9 pounds at 8 weeks and ate 2.09 pounds of feed per pound gain. Where the fat was replaced by corn and .1 pound dried skim milk, pigs weighed 34 pounds at 8 weeks and ate 2.11 pounds of feed per pound of gain.

In additional trials, the ration with added fat gave .84 pound daily gains, while the ration without the fat gave .85 pound daily gain. Pigs on both rations required about 2 pounds feed per pound of gain.

Now It's Foil-Lined Irrigation Ditches

Ordinary aluminum foil may enable the farmer of the future to irrigate with a minimum of water loss and get a maximum crop yield.

In tests at the University of Kentucky, bean yields were tripled when irrigation furrows were lined with 26-inch-wide aluminum foil. A slit was made in the foil at right angles to the row, every 1½ to 3 feet—with only enough water used to saturate the soil about the width of the foil.

Tests on tomatoes showed that the aluminum lining increased the yield 47 per cent, even when no irrigation water was applied. Apparently the reason for this was that the foil reduced evaporation and thus increased the moisture available to the plant roots—acting as a mulch.

New Mexico A. & M.

More Beef from Pastures

For more beef from pasture lands plan to renovate, mix grass and legumes, and use fertilizer. . .

Condensed from The Farmer

Robert G. Rupp

FARM those hilly, gully-marked pastures!

Make rolling, upland pastures produce like bottomland—not corn, but beef. Renovate hillsides with minimum loss of precious topsoil . . . double your dollar return per acre . . . increase gains by 100% . . . take fields out of government-restricted crops and still produce cash income.

Upper Midwest long-range trials say it can be done.

Renovation, fertilization and rotation boosted rolling Minnesota pastures from 138 pounds of beef per acre to 309—a whopping 123% increase. In dollars, that was an additional $37.40 worth of beef from each acre this past grazing season.

Proper grass-legume mixtures, plus rotation grazing did even better in South Dakota trials—344 pounds of beef from an acre, and at a grazing rate of 1.6 cattle per acre.

Three years ago a University of Minnesota team of soils, crops and beef men, backed by another team of 20 donors from the livestock, seed fertilizer and allied industries, set out to make rolling hills more productive . . . to make grass a more profitable part of Upper Midwest farming.

Not all problems are yet solved. The project, a five-year venture, is little more than half completed. But some answers are already clear.

For one thing, it has been established that hilly, unproductive pastures can be renovated without topsoil sliding into the bottoms. And good pastures can be made better.

"Soils subject to erosion, such as those used in this experiment, can, when used for pasture, produce a high return per acre in the form of beef," the beef-soil agronomy team of A. L. Har-

Reprinted by permission from The Farmer, St. Paul, Minnesota, October 1954

vey, Paul Burson, and A. R. Schmid now report.

That isn't the full extent of their findings, however.

Team Works on Three Fronts

Agronomist Schmid is unraveling the grass-legume mixtures that survive northern winters to produce the most nutritious pasture. Soilsman Burson is uncovering proper fertilizer rates and mixtures to keep those grasses and legumes productive. Beefman Harvey is gaining knowledge on how to put the most gain on steers at the lowest cost.

Together they are even learning that fertilizer and grass-legume mixtures can be combined to reduce bloat losses. South Dakota researchers, in separate but more-or-less parallel studies, are getting much the same results from their trials.

Messrs. Burson, Harvey and Schmid started three years ago with 90 rolling, Central Minnesota acres. They split their farm into equal pastures, so arranged that cattle could be grazed first on one, then another. Some pastures were left in old alfalfa-brome, plus various other grass-legume mixtures.

Some of the hills, which have a slope of up to 20% at the steepest point, were renovated by plowing. Others were broken up with a field cultivator and disc.

Almost immediately after renovation the freshly worked hills were hit by a heavy rain. Erosion was "terrific" on the plowed hillsides, but there was little washing from the surface cultivated area. Gullies "corduroyed" the plowed pasture, but not the disked-cultivated pasture. Now however, two years later, the plowed pasture has the nicer stand.

The No. 1 lesson learned: Don't use a plow on steep slopes.

Half of each pasture, both those renovated and those not, was fertilized. Five hundred pounds of 0-20-20 per acre was put on half of each pasture in the spring of 1952. It was put down to last for five years.

Companion lots of steers have been grazed on each pasture—some on the fertilized area, the rest on the unfertilized, since that time. The team wanted information on the grass-producing ability of fertilizer. They wanted it from the cattle themselves.

Last spring 25 "good to choice" Montana steers, averaging 577 pounds apiece, were turned on three 7.5-acre pastures of alfalfa-brome. Half of each pasture had 500 pounds of 0-20-20, put on two years ago—the other half had none. Each pasture was grazed in rotation.

The steers went on pasture May 20. They came off September 14. During those 117 grazing days the 11 acres of fertilized

pasture produced 3,477 pounds of beef. A like amount of unfertilized pasture produced only 1,557 pounds—less than half as much. On a per-acre basis, the fertilized pasture produced 309 pounds of gain per acre; the unfertilized only 138 pounds—again less than half as much.

In dollars, the fertilized pasture produced $66.46 worth of beef pre acre as against $29.06 for the unfertilized — $37.40 more! And at a cost of only $3.20 per acre (the charge assessed annually against 500 pounds of 0-20-20 over the five-year period).

Fertilizer Halves Grain Cost

Excluding the fertilizer charge, the cost of 100 pounds of gain was $5.78 for the unfertilized pasture and $2.59 for the fertilized (figured on the basis of an $8 per acre pasture charge for the four month grazing period).

Lesson No. 2: Fertilized pasture grazed in rotation can produce better than 100% more beef per acre—at a correspondingly higher value— than like pasture not fertilized.

Joint animal husbandry-agronomy studies at South Dakota State College bear out those Minnesota findings. On level-land pastures there, alfalfa-brome, rotation grazed, produced 344 pounds of beef per acre last season. Straight brome produced only 212 pounds of beef to the acre, and was able to carry only one animal to the acre as against 1.6 for the grass-legume mixture. A sweet clover-rye mixture produced 238 pounds of beef per acre, at a 1.5 head-per-acre rate.

In Minnesota, seeding mixture trials, carried on in conjunction with the fertilizer experiments, showed combinations containing alfalfa and bromegrass to yield the highest. Ladino clover added to the mixture. But birdsfoot trefoil, now being tried with varying success, couldn't hold its own.

The lessons learned: Stick to your alfalfa-grass mixtures to carry the main pasture load.

Highest yielding mixture so far uncovered at Rosemount has been seven pounds of Ladino clover, six pounds of Lincoln brome and three pounds of meadow fescue per acre.

"Ladino tends to fill the low spots around alfalfa and both are palatable and nutritious," points out Dr. Schmid. "Brome and Meadow fescue make a grass combination that should prevent bloat."

Several other conclusions have come out of the long-range project.

First, a separate study on feeding grain on grass this year showed cheapest gains can be made on grass alone. Steers on unfertilized pasture, getting grass and salt but nothing else,

produced 100 pounds of gain for $3.79. Those given 2.6 pounds daily of corn and cob meal, linseed oil meal, and alfalfa hay, plus their grazing put on weight at the same rate, but it cost more —$6.63 per 100 pounds of gain. When they went to market the margin over feed cost was $30.18 per steer for the grain-on-grass lot, as against $36.26 for the grass-alone lot.

Another item uncovered is the apparent control of bloat through fertilizer.

Last summer a steer was lost at Rosemount from grazing a pasture which contained 86% alfalfa and only 14% brome. None were lost where the legume-grass combination was more nearly in balance. To get that balance back nearer the 40%-alfalfa, 60%-brome combination which the team considers ideal, 60 pounds (actual) nitrogen per acre are this fall being added to pep up next spring's brome grass growth.

South Dakota animal husbandmen last summer lost eight head from bloat on a pasture that was 80% alfalfa and 20% brome. This year, after the brome had become better established and the grass-legume mixture had come more nearly into balance, they lost none.

Addition of fertilizer also seems to produce more even grazing of pasture. Cattle in unfertilized pastures at Rosemount tended to graze around grass growing up from dropping areas. In fertilized pastures, on the other hand, "those spotty areas ironed out."

Ewes Should Gain—Before lambing, ewes should gain 15 to 30 pounds. Plenty of high-quality legume hay is the basic winter feed, according to Frank Kreuzberger, Penn State extension livestock specialist. In the 4 to 6 weeks just before lambing, each ewe should get a half-pound of grain a day.

Pennsylvania State University

Alfalfa and Milk Fever

If you feed a cow alfalfa, red clover and soybean hay during her dry period, or at least the last 30 days of her dry period, she'll be more susceptible to milk fever than if you feed her cottonseed meal, rice and wheat bran.

A study of dairy rations shows that feeding a diet with a low calcium level and high phosphorus, such as cottonseed meal, will prevent milk fever, while a diet high in calcium, low in phosphorus, will give milk fever a chance to develop.

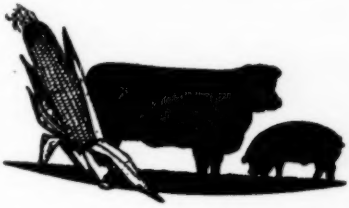
N. J. Farm and Garden

SUDDEN DEATH AMONG CATTLE

Why do cattle sometimes die suddenly? Here are some of the reasons. . .

Condensed from

American Agriculturist



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Another case involved three dairy cows that died quietly in their stanchions during a winhorses, and other accidents can result in similar deaths.

Various kinds of contagious diseases can be responsible for the sudden death of cattle, too.

Reprinted by permission from American Agriculturist, Ithaca, N. Y., November 20, 1954

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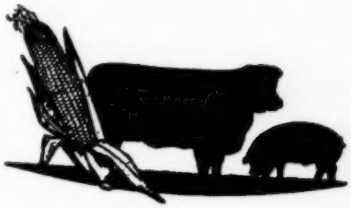

WE recently visited a farm where a cow had died unexpectedly in the pasture. She had been all right the night before and the owner was sure she had been poisoned by something. However, an investigation showed that trouble was due to a wire which had pierced the stomach much earlier. An abscess had developed around the wire, and the sudden death of the cow was due to its rupture which released a gallon or so of pus into the lungs. Owners often find cattle that have died suddenly.

We remember an incident concerning a dairy cow that was found dead in a pasture during the summer. Although she was at least 40 yards away from the nearest fence and the only tree was located at the other end of the pasture, it was finally decided that she had been struck by lightning.

Another case involved three dairy cows that died quietly in their stanchions during a winter night. The animals stood side by side and the cause of their death appeared to be quite a mystery at first. However, a check by an electrician showed a short circuit in the milking machine wire, while a leaky drinking cup had soaked the floor around them so the animals were electrocuted.

On another occasion a six months-old calf was found dead in its pen one morning. A post mortem examination showed the abdominal cavity to be full of blood from a ruptured liver. The owner believed the injury had occurred when the hired man kicked the calf in the right flank the night before. Jamming in doorways, kicks by horses, and other accidents can result in similar deaths.

Various kinds of contagious diseases can be responsible for the sudden death of cattle, too.

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One case involved two steers that were found dead in a feed lot as the first hint that anthrax was breaking loose on the farm. another concerned a yearling heifer that died before we reached her and was being butchered by the owner when we arrived. He reasoned that she would be all right to eat because of her sudden death, but changed his mind when we told him that the animal had blackleg. On another occasion a valuable pure bred cow was bought at a sale and then trucked without a stop for several hundred miles in sub-zero weather. She was found dead the third morning after reaching her new home, and represented the beginning of a costly shipping fever outbreak in that particular herd.

Although they aren't involved nearly so often as suspected, poisons also have to be considered as a possible cause of sudden death. They can be divided into two classes, being either plants or chemicals. The sorghums and similar plants containing prussic acid are the most feared ones, but spoiled sweet clover is a fairly common cause of trouble, too. A typical case concerns a cow that calved normally one night and was found dead the next morning because of bleeding that didn't stop after the naval cord of the calf was broken. Similar fatal bleeding may follow ordinarily insignificant cuts and bruises when spoiled sweet clover is involved.

The chemical poisons include rat poisons, spray materials, and paint containing lead. Unfortunately, plain carelessness is often to blame when they kill cattle. An illustration of such carelessness is furnished by the case of the farmer who cleaned out his granary at threshing time and swept up a broken bag of fertilizer with spilled grain. The sweepings were then put out in the feed trough and killed the two "boss" cows that got all of the poisoned feed.

There are various other possible causes of sudden death that we haven't mentioned, but we hope that you won't be too sure of the exact cause when cattle die suddenly. A thorough investigation and a post mortem examination will show that it was something altogether different from what you thought it was.

More Pulpwood—Pulpwood consumption in 1954 is estimated to be about 2.7 per cent higher than the previous peak year in 1953, says Walter Simonds, Penn State extension forester, and about 76 per cent higher than consumption at the end of World War II. *Pennsylvania State University*

TREE FARMING IS HIS BUSINESS

A trained forester uses new methods in managing his own wood lot. . .

Condensed from

Eastern States Cooperator

Adele S. Erisman

WHEN a man makes a good living from southeastern Connecticut's second growth woodlands he is indeed an exceptional man. When he does this while improving every woodlot in which he operates, increasing its productivity year after year, then he is not only an exceptional man, he is just one man alone. His name is Ripley Park.

Park is a big, soft-spoken, well-educated man, a graduate forester, a lifelong resident of North Stonington. He will tell you at every opportunity that, first of all he hates waste. The meat packers have learned to use every bit of the pig but the squeal. Park has used every bit of the wood but the bark. This isn't easy to do in an area where there are no wood industries that use short lengths or inferior woods. He has therefore had to find his own markets and develop his own methods of supplying them. At the same time he has managed to harvest no more than the year's growth and usually less.

There is no great trick in making money by cutting only the best and leaving the rest. That has been the usual practice in our small woodlots over the years, and it has resulted in their rapid deterioration. It is a practice due either to immediate economic need or simply to lack of long-range thinking about forest use. It is worth noting that 50% of Park's volume consists not of the best, but rather of material that is

Reprinted by permission from Eastern States Cooperator, Springfield Mass., July 1954

pure waste in usual practice; there's the trick.

How does he do it? He employs three or four permanent helpers. His mechanical equipment consists of two trucks, a sawmill, a chain saw, a crawler tractor, and very recently he has added a bolter. He owns about 500 acres more or less and operates on another 1500 or so.

Much material that is usually waste goes into charcoal; we sometimes smell the smoke from Park's two nearby kilns. He likes ironwood, dogwood and blue beech for making charcoal, which is marketed partly through retailers and partly to metallurgy firms who use it for purification.

The new bolter uses slabwood right up to the bark and cuts up small crooked trees efficiently. This wood makes shooks for box material. The grade three hardwood group now being cut on the bolter will be used for crating rockets, and other woods thus cut are being sold for lobster crating.

Cordwood is still sold in some quantity around here, and slabs are sold for firewood. But Park believes that improvement cutting will not become common practice until wood is as practical a fuel as coal, oil and gas are now. That means not until oil and gas become scarce. He admits that a properly conducted local pulpwood industry could also benefit the woods by making use of inferior trees. A woodland owners' co-op might be formed that would make good woodlot management a profitable farm operation by producing such things as furniture and briquets.

Of course there is always a market for good logs. Park sells some 4 x 4's and 4 x 6's for ship material and for industrial skids. His 6 x 8's, 20 feet long, are used for scales. Oak is best for these because it has more strength than most other woods. Some lumber is sold for house construction.

Park must spend nearly as much time planning operations as he does actually working in the woods. He hauls out an average of two or three truckloads of wood on daily year-round operation. The inaccessible or difficult-of-access areas worked during good weather; the easily reached areas in bad weather. He believes in making as many roads as possible through the woods so that his trucks can be driven right into the cutting area.

One wet day last spring a large turnout of Connecticut foresters came to see and hear about Ripley Park's methods. They visited a 20-year-old stand of red pine where Christmas trees had first been harvested and the remaining trees pruned eight years after planting. Re-

cently rough lumber had been taken out of this stand and sold at $70 a thousand.

I asked Park what he thought about planting conifers in our deciduous area. He does some planting in sunny openings on poor sandy soils, but he much prefers favoring thrifty young native hardwoods wherever they occur. He says they pay better because the conifers are expensive to buy, plant, prune and weed.

Occasionally he clear cuts a red maple swamp. We saw one where large tulip poplars, grew nearby. The idea was that this valuable species would seed into the open area since it needs sun. Some of the maple sprouts would then have to be removed, of course.

In another place we saw some good black walnut with lots of young trees around it. These are Park's pride and joy; we don't have many sites rich enough for them around here. Good-sized double-base trees are much in evidence in his woods, too. They can be harvested profitably.

Park does his thinning with an eye to keeping enough leaf cover to prevent drying of the ground underneath. He knows that undergrowth is necessary, too. It builds soil, adding humus that creates a yielding, spongy soil texture. The lesser plants also break the force of heavy rain. Of course no cows ever trample or browse his well managed woods—not when an acre of such productive woodland can yield as much return as an average acre of agricultural land. He sees the forest as a unit, a living, changing, tightly-knit community where each plant and animal occurring naturally has a place of its own, no matter how unimportant it may seem.

He advises anyone interested in managing his woodland for long-term yield to call in his extension forester to mark the trees that should be cut at 10-year intervals. Even if these trees cannot be marketed at a profit they can still be worth cutting. The orchardist does not expect to cash in on the peaches or apples he has knocked off the trees in the spring, but he knows that he can make up for the cost when he harvests a better crop of fruit in the fall. If a thinning job is out of the question, then the woods can profitably be let alone over the years. They will produce good trees without any attention whatever, but neither so many nor so quickly as they would under a thinning program. Trees are a good investment, sure to increase in value over a long period; a landowner could hardly leave his children a better legacy.

Perhaps the greatest value of

woods—and Park is always ready to point this out—cannot be estimated in dollars and cents at all. We in Connecticut, who lost more than 60% of our trees in the 1938 hurricane, can appreciate this. The pleasure they give us would alone be enough to warrant their care and protection.

Whether others can do what Park has done is a question. Such success as his depends on a number of uncommon personal qualities. First among them is a genuine love of trees, and then, a generous mixture of what we like to think of as good old Yankee virtues—thrift, ingenuity, business acumen and hard work. Still another, less common than any of these and possibly more important, we might call vision or imagination.

X-Disease of Cattle Now Controlled

No new cases of hyperkeratosis (X-disease) of cattle were reported to the U.S. Department of Agriculture during 1954. This would indicate that the disease has been practically eradicated, or at least reduced to such an extent that it is no longer important to the livestock industry, reports Dr. A. M. Lee, of the USDA's Agricultural Research Service.

Hyperkeratosis—an often fatal disorder, especially to calves—was so named because a characteristic leathery thickening of the skin accompanies the disease. Successful control of this costly livestock problem was made possible through government-industry cooperation.

A Federal-State research project, carried out between 1949 and 1953 by scientists of 18 States and coordinated by the USDA, revealed that the principal cause of hyperkeratosis was highly chlorinated naphthalene. This chemical was frequently added to lubricating oils and greases to give them "body."

Dr. Lee explains that some of the chemical found its way to farms and was absorbed by animals licking machinery or used crankcase oil. More found its way into animal feeds through greases used in lubricating feed-processing machinery.

Credit for the threat elimination, once the cause was known, says Dr. Lee, should go to the oil companies, manufacturers of petroleum products, and animal feed processors. These companies acted in response to the USDA request to cease using chlorinated naphthalene in petroleum products used on farms or in food-processing plants. "The record speaks for their excellent cooperation," declares Dr. Lee.

U.S.D.A.

There is No Cure for Bovine Brucellosis

Although there is, as yet, no cure for this disease, the dairyman can do much to keep it out of his herd and to control its spread if it appears. . .

Condensed from The Ayrshire Digest

Dr. S. H. McNutt,

Prof. of Veterinary Science, University of Wisconsin

IT has been well established that brucellosis of animals, including man, varies considerably in the manner in which it affects the different species. Man, swine and guinea pigs are usually more acutely affected and cattle are more chronically affected. Species differences among animals affected with brucellosis are well demonstrated in attempts at treatment. To generalize, chemotherapeutic measures (use of drugs) are more apt to be effective in those species less chronically effected.

Swine Brucellosis

Streptomycin with sulfadiazine 9 and aueromycin 10, have been tried experimentally in the treatment of swine brucellosis. It is questionable whether either treatment resulted in a cure but each had a beneficial effect. They cannot be employed in a practical way.

Bovine Brucellosis

In regard to treatment of bovine brucellosis, the situation is quite different. Neither the mechanics whereby immune bodies affect the Brucella organism nor the manner in which drugs affect the organism in the animal's body are well understood. For example, the blood serum of cattle that have never been exposed to brucellosis is 'swarming' with certain 'types' of antibodies for the Brucella organism. In infected cattle the anti-bodies are even more numerous. These antibodies should prevent infection in the newly exposed and quickly cure the disease in the infected. It is a strange circumstance that they do neither. Brucella germs within the body cells

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(leukocytes) are protected from both immune bodies and from drugs that destroy Brucella. With these facts in mind, it is obvious that the means whereby recovery is affected and how drugs destroy Brucella germs within the animal body are insufficiently understood. With a fuller understanding of these things it is equally obvious that attempted treatment of brucellosis in any species of animal, including man, must be on a 'trial and error' basis to some extent. We know that any drug employed must be tolerated by the host animal and detrimental to the parasite—the Brucella organism.

'Cures'

The possibility that one could discover a cure for brucellosis or for any infectious disease by mere chance has always been very remote. Nevertheless, many materials, drugs and mixtures have been proposed for the cure of bovine brucellosis. It was claimed that these 'cures' were discovered by chance. Cows that aborted once were fed these 'cures'. Because they did not abort the second time, which they seldom would have done without the treatment, it was claimed a cure had been effected. One of the first 'cures' which was proposed was carbolic acid. It was soon proven to be worthless, but still some individuals clung tenaciously to the slim hope that it might be effective. Other 'cures' such as '3-V Tonic' and 'Bowman's Remedy' quickly followed and were eventually proven valueless in the treatment of brucellosis in cattle.

Drugs

During the past 10-12 years it was found that certain therapeutic measures were somewhat effective against experimental brucellosis of laboratory animals and against human brucellosis. These have been tried in cattle. Sulfadiazine and blood transfusions, aureomycin, penicillin, sulfathiazol, sulfanilimide, protosil, streptomycin and sulfadiazine, and many other products have been tested. No beneficial effects could be detected in any instance. It may be concluded that drugs and biologic products which have been shown to favorably influence the course of brucellosis in some species of animals, are without effect on brucellosis of cattle.

Nutrition

The thought and even the belief has been entertained by some that the state of nutrition has much to do with susceptibility, cure, and prevention of bovine brucellosis — that an adequate diet will prevent Brucella infection in cattle by rendering them insusceptible or, if already infected, will aid in recovery. Much has been written on the influence of nutrition on experimental infection in the scien-

tific press. Care is necessary in the interpretation and application of this information, or one may arrive at erroneous conclusions.

But regardless of what concluclusions one reaches after reading the literature, the fact remains that controlled scientific and yet practical tests have failed to show that the ration had any significant influence on either the susceptibility of cattle to brucellosis or on the course of the disease in infected animals. This is certainly true when an ordinary (practical) ration was compared to a supplemented ration in cattle.

It was found that a good ration (high in alfalfa hay, minerals and supplemented with cod-liver oil) did not influence the course of brucellosis in cows, that a ration low in vitamins A and B, and in calcium did not cause white rats to be more susceptible to experimental brucellosis and that a trace mineral supplemented ration failed to influence the course of bovine brucellosis. It has been concluded 'that there are yet no data to substantiate the belief that rations deficient in proteins, minerals, or vitamins play an important part in the prevention or treatment of bovine brucellosis'.

There is no cure for bovine brucellosis at present.

Nothing remains static—hundreds of new chemotherapeutic agents are being developed every year in research laboratories. It is possible that one or more of these may eventually prove effective against brucellosis of cattle. This may be in the near future or in the distant future. In the meantime we cannot wait nor do we want to wait.

Eradication

This being the case, the control and eventual eradication of bovine brucellosis must depend on preventing exposure of susceptible animals to the infected and the use of vaccine in calves to produce a degree of resistance should animals be accidentally exposed. Plans for the control and eradication of bovine brucellosis are outlined clearly by the United States Livestock Sanitary Association. That bovine brucellosis can be controlled by these means has been amply demonstrated on individual farms and on a county and state basis. Too many have forgotten that brucellosis is an infectious disease and not a 'program'. Each individual must act accordingly. Too many attribute reinfection of clean herds to 'bad luck'. Very largely, each cattle raiser makes his own 'luck' regarding reinfection — purchase of animals on a single test or no test at all, no isolation and no retests of the new purchase, no isolation in case of abortion, allowing clean animals to inter-

mingle with the infected, etc. These procedures may fit a 'program' but they do not fit an infectious disease, nor can one say that he has 'bad luck' following infection traceable to such practices.

No one will deny that there still are defects in the brucellosis eradication programs as now proposed—we still lack some k n o w l e d g e — but even a perfect program will be unsuccessful if the people themselves do not want it. This is the crux of the whole problem—if we want brucellosis eradication we can have it; if not, we will not have it.

How To Prove Your Age for Social Security

Many of the thousands of farm operators and farm workers who will become eligible for the expanded Social Security Act coverage in 1955 are among an estimated 40 million Americans who do not have birth certificates or other means of officially proving their ages, a necessary requirement in qualifying for Social Security benefits.

These persons, however, may obtain this vital information from the historic records of the U. S. Bureau of the Census. During the last decade, the Census Bureau has handled more than two million requests for copies of Census records from individuals for use in qualifying for Social Security benefits, in settling estates and insurance cases and for other purposes where it is necessary to furnish evidence of identity, age or citizenship.

Transcripts of personal census records can be obtained from the Census Bureau upon payment of the cost of searching the records. Federal funds are not appropriated for this service and the fees charged are used to pay the salaries of the searchers and to cover the cost of the necessary office supplies.

A fee of $3.00 is charged for searches of two censuses for one individual, given routine handling. Expedited handling can be obtained for a fee of $4.00. Routine handling generally requires from four to six weeks to complete while expedited handling is usually completed in one or two weeks. Personal information recorded by the Census Bureau is entirely confidential and may be furnished only upon written request of the individual to whom it relates or his legal representatives.

Persons desiring transcripts of their personal Census records may obtain application blanks and information by writing to the Bureau of the Census, Washington 25, D. C.

U.S.D.A.

FUR CROPS FROM FARM LAND

Game animals can readily be converted into cash on many farms. . .

Condensed from
The Rural New Yorker

James E. Lawrence

ALTHOUGH great strides have been made by the fur farming industry to meet the demands and whims of the buying public, there is still a wide-open market for wild-caught furs. This is strongly evidenced by the thousands of farm folks who regularly set out profitable traplines each year.

According to a number of estimates, farmers and farm boys annually harvest over 70 per cent of the country's 125 million dollar raw fur crop.

Muskrats on Marshlands

That the value of fur-bearing animals offers a tangible return is illustrated by the number of folks who periodically harvest a fur crop from their own lands. Stanley Willig, who lives near Stanfordville, N. Y., finds that the muskrats on waste marshland provide a return large enough to pay the tax bill on his 145-acre dairy farm. Instead of trying for a variety of furs in a hit-and-miss fashion, Willig restricts his trapping time and effort solely to the muskrat. He claims that by concentrating on this quality fur animal he is assured a good catch and does not waste time on other animals with inferior pelts. Although game technicians have informed him that his marsh can stand heavier trapping than it now receives, without harm to the breeding muskrat population, Willig has devised a unique harvest method of his own. He simply stops trapping when he has enough money for taxes. Under this set-up, he has trapped as many as 71 muskrats from his six acres of marshland without endangering the source of supply.

William Strauss of Amenia, N. Y., is another farmer who en-

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joys muskrat trapping. A couple of years ago he built a dam across a small marsh on his Dutches County dairy farm and equipped it with a valve to control water levels. He did this in cooperation with the Dutchess County Soil Conservation District and the New York State Conservation Department in an effort to manage his marshland for high muskrat production. The dam and valve now allow him to maintain water levels at a depth which encourages the growth of desirable muskrat foods, such as cattails and bulrushes. Moreover, he can now stabilize the water in such a manner as to prevent the extreme fluctuations that formerly discouraged muskrats from using his marsh.

Prior to this construction, only a few transient muskrats ever used the Strauss marsh. But where once limited food supplies and uncertain water levels kept permanent residents away, the marsh is now on its way toward becoming a first-class fur-producing factory. The spring trapping period following the Autumn the dam was built yielded six muskrats, mostly stragglers, but the next season produced 14. Then it was 31, and this season Strauss expects to harvest at least double that. His objective is a managed muskrat marsh, the type which will produce the 10- to 30-dollar annual fur crop per acre that wildlife biologists report possible from properly handled wet wastelands.

As a contrast to marsh trapping, John Lobotsky of Rhinebeck, N. Y., concentrates on the abundant streams and wooded areas that are part of his 160-acre vegetable farm. Although muskrats are caught occasionally, mink, skunks, raccoons and foxes provide the major share of Lobotsky's fur crop. A few years ago a colony of beavers settled on the farm and supplied a part of the catch. Recently, however, the animals moved away when their food supply gave out.

While almost a dozen different types of fur-bearing animals are trapped on farmlands in the Northeast, five distinct kinds outrank all others from the standpoint of the number taken, the monetary returns from the pelts and the sport in harvesting them. These are muskrat, raccoon, fox, skunk and mink. The latest U. S. Fish and Wildlife Service figures show that the first three of these furbearers account for more than 50 per cent of New York's total fur catch. From the trapper's standpoint, knowledge of the proper way of handling all of these important fur crops, as is true of all farm crops, is an essential part of a successful harvest.

The Best Traps

As applies to all types of fur

trapping, the muskrat trapper should provide himself with the best traps possible to assure a maximum of trapping efficiency. Steel traps No. 1 and 1½ are the sizes most generally used for muskrats. Trap types vary, however, but one of the most popular kinds in the Northeast is the stop-loss. It is equipped with a delayed action guard which springs over the main jaws and holds the animal in such a tight position that it cannot gnaw or wring loose and escape.

Generally speaking, there are three types of effective sets for muskrats. One is made in marshy areas with little or no water, one in open water and one under ice. In marshes with little water where there is no chance of setting a trap so the animal will drown, it is particularly important to use the stop-loss trap. In these situations, the trap should be placed on feed beds or in runways in at least two inches of water.

Traps set along streams and ditches should also be placed in about two inches of water, especially when set at the bottom of muskrat runs or slides. The trick here is to set the trap stake through the trap chain on a slant in deep water. When captured, the animal will then dive into deep water and drown.

Ice trapping for muskrats is often necessary when the season opens early and ponds and marshes are still frozen over. A good ice set is made by securing a trap on a board with several nails and fastening a carrot or apple just above the trap. The board is then placed through a hole in the ice and set on an angle by resting it on the bottom of the pond or marsh.

Raccoon trapping is often of special interest around the farm because this animal has a way of getting into places where it does not belong. Marauder of the corn field and the chicken house, the wary raccoon provides the trapper with much sport on the trapline. At present, New York State is experiencing an upsurge in raccoon population and, despite low pelt prices, this animal continues to be popular with trappers.

Although cunning, the raccoon is extremenly curious; this often leads to its downfall. A bright object, such as a piece of tin or aluminum, fastened to the pan of a No. 2 double-spring trap makes a good attractor for capturing raccoons. Bait made from honey or part of a fish or bird suspended over the trap makes another good set. In both cases, it is best to select a place along the edge of a stream that raccoons are known to travel. The trap should be set about two inches under the surface of the water and fastened to a stake or heavy drag.

Foxes are the shrewdest, sly-

est and most cunning of the fur animals encountered by the farmland t r a p p e r. Although they are difficult creatures to trap, they can be caught successfully once their habits and ways are understood and caution is used in setting traps for them. Fox traps should be kept free from strong smells, oil and grease. Important precautions are to boil all traps and handle them only with clean gloves. Traps boiled in a solution of soft maple bark, hazelnut hulls, hemlock bark, walnut or butternut hulls, wild sage, willow tops, or balsam boughs give them a dark color which prevents rusting and reduces the fox's suspicions.

The Fox Set

By far the most popular and most effective fox set is the dirt hole set. For best results it should be made in open woods clearings, open fields and bare pastures since these are the places where foxes hunt and play most frequently.

The dirt hole set is essentially an attempt to imitate where a fox has buried a piece of meat. It is made by digging a hole six inches deep and three inches wide. The dirt removed is carefully piled over the ground in front of the bait hole in a normal fashion, just as though a fox pawed it that way. Then a hollow is made in this pile of loose dirt and into this hollow goes the trap, a No. 2 double-spring. Properly set, the trap's pan should be about six inches from the mouth of the bait hole. The trap is held fast by driving a stake through the ring of the trap chain and into the earth directly under the trap. It is always good to cover the pan with a piece of canvas, cloth or wax paper, making sure this material is tucked neatly under the set-jaws. The final operation is to sift dirt over the trap to a depth of half an inch. The bait—tainted meat cut into walnut-sized pieces—is placed in the hole and covered lightly with dirt.

Skunks Easily Caught

Skunks are one of the most easily caught farm furbearers; yet removing these animals from a trap without serious consequences is not always easy. The most effective skunk sets are those located at or near the animal's den. The trap, a No. 1 or 1½, is set in small hollow dug into the ground and covered with fine grass or chaff. It is best to keep in mind that the trap should be so arranged as to prevent the captured animal from getting back into its den or crawling under nearby brush piles.

Mink trapping, like fox trapping, requires great care and preparation in preventing human scent at the set.

NEW JOHNSON GRASS HYBRID HOLDS GREAT PROMISE

Newly developed grass will flourish in areas of low rainfall. . .

Condensed from The Cattleman

A NEW Johnson Grass hybrid now being tested by Southwest Research Center's agricultural division may help drouth-stricken South Texas ranchers solve some of their range feed problems.

"The grass will apparently flourish in areas that have little water," said Dr. Charles L. Shrewsbury, associate director of Southwest Research Center's Foundation for Research and Education. "It produces more tonnage than anything else we know of, and can either be grazed or cut and used as silage or dry feed."

The grass has been tested in Southwest Research Center's San Antonio nursery. The Foundation's agricultural research is aimed at developing better forage for the Southwest and it has established grass nurseries over Texas to test out new grasses and see how they are suited to the area. One nursery is located near San Antonio, one near Dallas, two on the King Ranch, and a new one has recently been opened in the Brownsville area.

The Johnson Grass hybrid tested is a perennial sorghum, Sorghum Almum, and originally came from Argentina. It is a natural hybrid of Johnson Grass (Sorghum Halepense) and Sudan Grass (Sorghum Vulgare).

The crop has the tall, luxuriant growth characteristic of Sudan combined with the perennial growth of Johnson Grass. In addition, it does not have the undesirable spreading of underground roots that Johnson Grass does.

The grass has one drawback. Like other sorghums, it produces prussic acid in the early growing stages. Livestock should not be allowed to graze it until it is 15 or 16 inches high. It is more desirable as a forage than a grass since it is poisonous during the first 10 days of its growth.

The grass was first tried out in Georgia and Southwest Research Center scientists obtained

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a small packet of the seed from Prof. S. H. Morrison of the Georgia Agricultural Experiment Station. Scientists planted the small amount of seed in about six 20 foot rows last April 1.

It was watered by sprinkler at the time of planting and has not been watered since. During April the rainfall measured 1.89 inches and there was 3.1 inches of rain in May. From January to April was a very dry period with only 1.21 inches of rain in the three-month period.

However, the seed germinated very fast and growth of the grass has been unusually rapid since, Dr. Shrewsbury reported. Other grasses in Southwest Research Center's San Antonio nursery have not shown nearly the vigor and growth under the same conditions.

"The grass is excellent in color," Dr. Shrewsbury said. "It is tender rather than woody and is palatable to both horses and cattle. It is also producing a great deal of seed which will be saved.

"At the time of checking in July it was about 6 feet as compared to 4 feet 8 inches for common Johnson Grass growing nearby. Three feet of one row was clipped and this produced five and one fourth pounds of green forage as compared to three and three-fourths pounds for the common Johnson Grass. Prof. Morrison reported that the Johnson hybrid yielded from 10 to 15 tons per acre of green forage the first year and more the second.

Thoughts From A Crop Report

The report of the U.S.D.A. issued October 1st gives ample proof that we are living in a changing world. Wisconsin, with a yield of 57 bu. corn per acre, upsets some old theories regarding the northern limits of the Corn Belt. It has taken hybrid corn, commercial fertilizer, power machinery, and considerable persuasion to bring this about. Minnesota this year is the fourth State in the Union in soybean production. Back in 1939 when the first soybean mill was located at Mankato it was necessary to bring in soybeans from Illinois and Iowa to operate the mill. Farmers in southern Minnesota were adamant in their thinking that they could not grow soybeans. New earlier maturing varieties, commercial fertilizer, power machinery, and various other factors have entered into the movement of the soybean to the Northland.

Northwestern "Ag" Letter

HOW A CHANCE SEEDLING BECAME A DELICIOUS NEW PEAR

The story of a new pear which shows much promise both for home and commercial use. . .

Condensed from American Fruit Grower

Eldon S. Banta

THE new Starking Delicious pear may be the variety many fruit growers are looking for. Its outstanding characteristic, a high resistance to fire blight, makes it a notable contribution to horticulture. Add to this its productiveness, large size of fruit, attractive yellow color when ripe, and its fine texure and flavor, and you come up with a pear that may well be the answer to a fruit grower's dream.

The story of the new pear begins on a farm near Tipp City, Ohio, in the early autumn of 1931. Marvin A. Cook was a high school lad then, who liked to meander through his father's orchard sampling the apples and pears growing there. One early September day he came upon an old tree that had blown down, and noticed that a sprout had grown up in its place. Whether it grew from a sprout above the graft union or from the rootstock below, no one may ever know.

But the pears that Marvin tasted that evening from the old sprout were simply delicious. Closer examination of the tree revealed that it was different from the Bartletts and others growing nearby. For one thing, there were no dead twigs on the new tree. It had not blighted.

The next spring Marvin grafted several seedling pear trees to scions from his favored sprout. He wanted to see if his tree was really as good as it had appeared at first. Thirteen trees of Marvin's first propagation still bear heavy crops of fine fruit. Not once during the past 22 years has fire blight caused damage to any of these trees. Even in the severest blight years, Marvin had a difficult time finding a blighted twig on a tree. They have occurred, but are very rare.

Wishing to perpetuate the

Reprinted by permission from American Fruit Grower, Cleveland, Ohio, November 1954

variety and extend its planting over a wider area, he recently sold the variety and propagation rights to Stark Brothers Nursery, Louisiana, Mo. It is now being propagated and offered for sale under the name of Starking Delicious pear.

To help evaluate the characteristics of the new pear variety, Paul C. Stark called a meeting of leading horticulturists at the Cook Farm on September 17. Wthout exception, the visitors gave the new pear their hearty approval. Some were not sure of the tree's perpetual blight resistance, others did not feel that the fruit quality was tops, but they agreed that the new pear possesses more good points than any other variety now in production.

The pear flesh is fine-textured, free of grit cells, juicy, and well-flavored. In all-around evaluation, most of the horticulturists placed it a degree below Bartlett, a few considered it equal or slightly better.

The horticulturists were also treated to samples of Mrs. Cook's preserves and marmalades from the new pear. They thought it a fine variety for this purpose.

Bloom period of the new pear comes about two or three days before Bartlett. Harvest of the fruit on the Cook farm in west central Ohio begins between September 5 and 10, or from 14 to 21 days after the Barlett harvest begins. It extends over a two-week period.

It will probably never be known what the parentage of this chance seedling was. Some, as Dr. Freeman S. Howlett of the Ohio Experiment Station, feel that it may be a seedling of the Bartlett variety with some Oriental variety in the parentage too. Whatever the parentage of this creation of nature, the future is bright and hopeful for it.

Molydenum Important If You Don't Have Enough—

Molybdenum, a trace or minor element, can be a big benefit to crops when applied to soils deficient in this element. Just one ounce per acre of sodium molybdate has increased yields of red clover as much as six times! It has also boosted yields of cauliflower, broccoli and tomatoes.

Recent USDA analyses of a wide range of soils show that there are about 2.5 parts per million, or about five pounds in an acre of soil to a depth of six inches, on an average. But you can't sprinkle it on like sugar over cereal, because crops require extremely small quantities for good growth. And this can be very toxic to livestock. *N. J. Farm and Garden*

Youth Wins Soils Award

Awards are now offered for meritorious performance in soil and water conservation. . .

Condensed from The Southern Planter

Jesse C. Green, Vo-Ag Area Supervisor, Virginia

IT is recognized that the very foundation of farm properity depends upon the maintenance and improvement of the soil, and its ability to retain moisture. The National Association of Future Farmers of America, for the past several years, has recognized the importance of this phase of farming and as a result is offering awards to boys studying vocational agriculture in high schools for meritorious performance in soil and water conservation.

H. D. Seal, teacher of Vocational Agriculture at the Henry Clay High School at Ashland, Virginia, accepted the challenge and is including good soil management as an integral part of the course in vocational agriculture. Other teachers throughout the county are conducting similar programs.

Let's take the case of Wilbur Lawrence, member of the Ashland F.F.A. Chapter, who won top honors in Virginia last year in "Soil and Water Management." His program is not considered an end within itself, but indicative of what can be accomplished, and the realization of the necessity for stressing this problem among boys in the early part of their farming programs.

Wilbur's family moved on their present 114-acre farm four years ago. Some of the neighbors looked askance at them for thinking that the farm could produce enough to support a family. Indeed, it would not in its then run down condition!

Wilbur became interested in the Soil and Water Management Contest in his F.F.A. chapter, and got busy and cleared 27 acres of land and leveled 30 more acres with his bulldozer. The same bulldozer was used to clean out 550 feet of ditches and to drain 12 more acres. Permanent pasture was established

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on 35 acres, and 35 acres of existing pasture was improved with lime and fertilizer. This took 35 tons of fertilizer, 75 tons of lime and 400 loads of manure. The farm now produces pasture and hay to feed 47 Angus beef cattle.

Two farm ponds of approximately one acre each were built with with the bulldozer. These ponds furnish water for the livestock, conserve moisture, and provide fishing for sport. Borders have been planted for wildlife food, and pine seedlings were planted on land economically unfit for crops. The woodland is protected with fire lanes.

Anyone viewing this program must surely recognize that the ambition and enthusiasm of youth, coupled with programs sponsored by the conservationists and vocational argiculture, can save soils and make them productive.

All will be pleased to know that both Wilbur Lawrence and his Vo-Ag Instructor, H. D. Seal, received highest national honors at the annual FFA convention, Kansas City, early in October.

★ ★ ★

Holstein Cow Establishes Big Production Record

Shattering by wide margins all previous national records for both milk and butterfat production, a New York registered Holstein has become the alltime champion for cows milked twice daily.

Her name is Hamaret Queen Prospector and she is not new to the inner circle of cows. Her current record of 35,565 pounds milk and 1,319.1 pounds butterfat is her second record above 30,000 pounds milk and 1,000 pounds butterfat, either goal considered particularly outstanding in any testing league.

She is owned by Archie Meek, Norwich, N. Y., whose registered Holstein herd has become widely known for high production. Mr. Meek is himself well known as a pasture and roughage expert and skilled dairyman.

Only 6 years, 11 months of age when the record began, the new champion now has three consecutive records totalling 87,675 pounds milk and 3,118.5 pounds butterfat, a lifetime of work for most fine cows and more than four times as much as most produce in their lifetimes.

Farm Ranch and Home News

EXTENSION'S NEW LOOK MAY SET FUTURE FARM STYLES

College extension workers cooperate with U.S.D.A. on Farm and Home development for better farm living. . .

Condensed from Agricultural Leaders' Digest

COOPERATIVE Extension's new look is becoming to it! And farm folks like it!

From numerous reports from State Agricultural Extension directors made lately, the preliminary enthusiasm and interest in the family unit or farm and home development approach is quite general and uniform. The ideals sought by the newer program of closer relations with local groups and individual families seems to have captured the imagination and fired the zeal of veteran agricultural educators.

Under Public Law 83, the sum of $7,064,721 is available for increased funds for state distribution in "new money" with which state forces will join county extension staffs in an enlarged program aimed at the farm unit approach.

Missouri a Pioneer

Thousands of Missouri farm families have started developing their plans under this system of farm and home planning. Many of them have the plans fully in operation with fine results. According to word from C. R. Meeker, Extension farm management specialist, the possibilities are indicated by such improvements as these, he says: Grain yields up 50 to 100 percent, livestock numbers increased several times, net farm incomes up $1,000 to $5,000, soil erosion under control, and better all-around family living. He cites a typical farm example. The Callahans of Chariton county went into debt $16,500 for a 240-acre farm in 1944. Carrying out their balanced farming plan made in 1947, enabled them to cut their debt by $12,000 and to invest $19,795 in farm and home improvements. Their animal production has risen and all the farm has been fertilized according to soil test,

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while 80 percent of the sloping crop land has been terraced.

It is said that the balanced farming program has been very helpful in the recent drought years, one family in the deepest of drought areas raising enough hay and silage on 138 crop and pasture acres to carry 50 head of livestock through winter to spring grass.

"By 1963, the Missouri balanced farming program will probably expand to 75,000, instead of the 25,000 farmers we now have enrolled," states Mr. Meeker.

He also explains how the other agencies can fit into the farm plans thus developed. Many facilities are needed to keep things on the move, Mr. Meeker points out. These include dirt movers, lime haulers, fertilizer, feed and machinery dealers, artificial insemination people, plumbers, bankers, and —on the technical side—vocational ag teachers, soil conservationists and college specialists of all kinds.

With its relatively long experience with this system of farm and home development and community progress, Missouri has been the proving ground and the "class room" area for all extension workers who have since tried to expand farm unit efforts.

Kentucky on the Move

Ralph J. Ramsey, field agent in rural sociology at Kentucky College of Agriculture outlines it this way: "The farm and home development program is a method used in extension work to teach farm and home planning to a relatively few families who will then serve as demonstrators of recommended practices. Husbands and wives attend the group meetings and jointly plan their own farm and home operations as a unit.

"Families taking part in a county are selected by the county agricultural extension advisory committee. Preference is given to geographical distribution, to young farmers, to those who are owners, and to those spending full time on the farm."

In making his survey of "sample families" doing the work, Mr. Ramsey said they averaged 10 years younger than Kentucky's average farmer, they had more formal education and belonged to more organizations than the usual white farm owner in Kentucky. Their ages ran from 25 to 65. Nine-tenths of the families reported some children. The most frequent way of learning about the balanced farming program was the county agent. In these families an average of 11 changes were reported in their farm operations, with the state program credited for most of them. A committee is now completing a formal

policy statement for extension workers to use as a guide.

Ohio Eager to Begin

"We in Ohio will welcome the opportunity to expand our staff. We will add 30 new county extension workers and 6 statewide members. All will emphasize farm and home development, as we call it. They will expand their activities in the marketing field and promote wider discussion of public affairs," declared Director W. B. Wood, Ohio State University.

"It will mean more on-the-farm and in-the-home contacts with farmers and homemakers.

Texas Has Roundup Plans

"It is our plan to employ a minimum of 55 additional extension workers for this program," writes J. D. Prewit, associate extension director, Texas A and M College.

"Director Gibson has various patterns in mind to set up, owing to the limited funds for a state as large as Texas with 254 counties. Note that 24 counties will be chosen for the employment of associate agents to devote full time to the farm and home development work. Twelve of the 24 counties will be serviced by two associates each, one for farm management and one for home management. There will be no extra agent used in most of the counties, and Director Gibson has announced that by July 1, 1955, farm and home development work will be under way in every Texas county. A minimum of 5 farm or ranch units in each county is the goal, to require about half a day weekly in services."

Familar in North Carolina

"This farm unit approach is nothing new to North Carolina," writes F. H. Jeter, extension editor at Raleigh. "We have had a working relationship for years with Tennessee Valley Authority by which they have put in funds for us to set up definite farm management programs in 15 of our western counties. These are test demonstration farms and has entailed a complete analysis of each one, with a full record of all operations, as well as expenses in the home.

Director D. S. Weaver has earmarked federal funds in three different ways, with the bulk of the money (85 per-cent) for use at county levels. The three definite uses for funds are for farm and home education, marketing education, and educational work in public policy. The agents and each family will work out plans designed to return the highest possible income and raise the living standards.

Louisiana Is Ready

"Since farm production costs and living expenses have gone so high, the people need more scientific research information

tailored to meet their specific problems," states Director H. C. Sanders, Louisiana College of Agriculture. "In the farm and home development plan agents spend enough time with the family to get well acquainted with their resources, needs, production and home making practices, and their desires as related to farm and home."

Farm and home work was expanded in 1953 in anticipation of new funds, so that 300 families, a few from every parish, already are participating in it. Methods for the new program will be based on that experience.

Arkansas Sees Opportunity

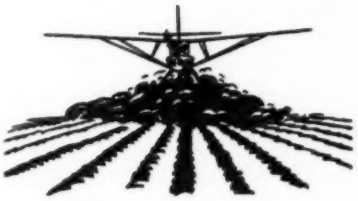
Associate Director C. A. Vines of Arkansas College of Agriculture reports that they regard this as one of the best opportunities ever realized to pull together the latest recommendations and combine them on one farm and one home so the results can be studied. They also look at it as a chance to cut the lag between the time that new facts are developed by research and their farm application.

"In Arkansas we have selected 20 counties and have employed 18 associate county agents as of September 20. They will devote full time to a method of working with people." says Mr. Vines. We think that in each of these counties we will start with a small number of farmers—perhaps not over 20 in the first 6 months—and then expand according to our experience. We hope that within a period of a couple of years each of these agents will be working with an average of 40 families.

Arkansas plans call for employment of associate home demonstration agents in at least 6 of the first 20 counties. If they could get the qualified personnel more would be employed, they claim. A training program has also been set up for personnel. To prepare for this, 17 of the staff members spent a week in Missouri studying how their pioneer effort has worked. Afterwards a week of further training was in order, using a farm and home as the laboratory for it. Then all the personnel employed in the 20 counties selected were put through a course. Later it is hoped to have a few farms and homes included in all of the counties.

"We are amazed at the response from farm people and business leaders, and the demand is now greater than we can meet. Our entire staff is enthusiastic about this new approach for doing good extension work," concludes Mr. Vines.

These reports are indicative of the "New Look" in Agricultural Extension in each state.



AIRCRAFT IN AGRICULTURE

Few persons realize the importance of aircraft to agricultural production and conservation. . .

Stuart W. Turner, Consulting Agrologist

THE history of successful "firsts" in the United States lists many events well known to almost every schoolboy . . . the Wright Brothers with their first successful heavier than air flight with a powered machine . . . Cyrus McCormick and his reaper . . . strip and contour farming for soil conservation. But how many schoolboys or even adults have any idea of the history of the most rapidly developing change in agriculture of this century . . . the use of aircraft in Agriculture?

It is possible that if someone had told the Wright Brothers that one day aircraft would be used to seed crops and then fertilize them, kill weeds without injuring the growing crop, control plant diseases and insect pests, prevent frost damage, herd ducks and feed oysters, they would probably have thought that this was carrying the use of aircraft too far. On the other hand, it is entirely possible that such men of vision would have accepted such developments as logical and practical as they have turned out to be.

It all started in 1921 when J. S. Houser dusted a Catalpa grove with Lead Arsenate for the control of Catalpa Sphinx, here in the United States. During the following five years the use of Lead and Calcium Arsenate for the control of insects spread like wildfire, and a new industry was born. Cotton insects in the U.S., the Nim Moth in Germany, Locusts in the Philippines, were all introduced to lethal airborne applications of these chemicals. Paris Green was dusted on swamp waters in Florida and Louisiana for the control of the Malaria Mosquito Larvae.

In 1926, the first attempts were made to control insects af-

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766 Dexter Horton Building, Seattle 4, Washington

fecting Peach orchards in Georgia by the aerial application of Lead Arsenate dusts. In that same year, Calcium Arsenate dusts were used to kill the Hemlock Looper in Wisconsin and the Gypsy Moth in New England. In the 1930's aircraft dusting methods were amplified and control operations were undertaken against the Hemlock Looper in British Columbia, Ontario and Nova Scotia where Canadian Forests were affected, and in the State of Washington for the same pest. The Russians experimented with the use of aircraft to control Codling Moth and Sugar Beet Webworm. Cranberry bogs in the eastern United States were dusted for Leaf Hopper and Maggot control. In the years immediately prior to World War II, new synthetic insecticides such as DNOC were being used in Germany and Poland for insect control from the air.

Until 1938, the only insecticides to be applied by air to any extent were Lead or Calcium Arsenate and Sodium Arsenate. These materials were applied as finely ground solids, that is, as a dust. Dusting was simple . . . take a light plane, put in a hopper with agitator and gate, dump in 500 pounds of dust direct from the bags, take off, fly low over the field, open the gate and let it go. No mixing equipment or loading pumps were needed. No pumps or nozzle assemblies were on the aircraft. Unfortunately, the results obtained were very spotty and in many cases unsatisfactory. It was shown that in some cases only 15% to 25% of the material that was released actually got down to the crops where it could do a job of insect control.

It was not until the development of low-volume liquid spray methods, using newer chemicals for the control of insects and more recently weeds, that the use of aircraft really became important in the agricultural field. This newer low volume spray method was first used in 1941 for the control of mosquitoes, especially malaria mosquitoes, with the combination of DDT and newer types of aircraft resulting in successful control of this pest in areas in Italy, Panama and Burma. Many combat types of air craft were used during the war for this work, and with the return of peace, there were not only large numbers of surplus aircraft available, but also many pilots who had learned to fly during the war and wished to continue in the flying business in civilian life.

These "Crop-Dusters" as they became known received their biggest boost from the development and introduction of the selective weed killing chemical called 2,4-D. Initials are fre-

quently used for newer agricultural chemicals for good reason . . . the full name is too long, as in the case of this chemical . . . 2,4-dichlorophenoxy acetic acid.

When this chemical was first introduced it was in such a form that large volumes of water had to be used per acre in order to apply the chemical. Initial work with dust forms of 2,4-D had shown that it could drift several miles, with the attendant possibility of injury to susceptible broad leaf crops such as cotton and grapes. Spray forms could be more easily controlled as far as drift from aerial application was concerned, but it was not practical to fly on the 40 to 50 gallons of water per acre required as a carrier. Chemical companies then went to work and came up with liquid concentrate forms that could be applied by aircraft using as little as ½ gallon of oil "carrier" per acre. This immediately opened a whole new field of activity to the crop dusters, and the number of firms engaged in such operations increased several hundred percent overnight. A single plane such as the Stearman could, by using the new low volume methods, cover as much as 2000 acres in a day when spraying wheat land . . . chemically weeding the crop as it flew.

Similar low volume formulations were developed for popular insecticides such as DDT and Parathion. This was of special interest to those engaged in large scale control of forest insects. In recent years, areas exceeding 2,000,000 acres have been successfully cleaned of insects such as the Spruce Budworm by aircraft using 1 pound of DDT in solvent with 1 gallon of oil carrier per acre. This type of operation reached its peak of efficiency and effectiveness in 1954 when Central Aircraft of Yakima successfully sprayed 59,000 acres in Michigan for Gypsy Moth control, using a workhorse of World War II, the B17, in 5 days!

The rapid influx of operators into the crop dusting field, and the general lack of knowledge initially as to precaution in handling and spraying the newer chemicals, resulted in several cases of accidental damage to susceptible crops. Unfortunately, such incidents have received publicity in many areas, and the actual benefits obtained from the use of aircraft have been largely overlooked.

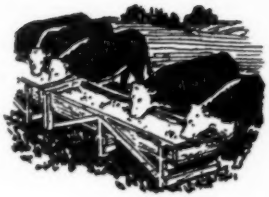
Some idea of the growth of this industry in recent years is to be found in a comparison of the acreages treated. In 1950, some 25,000,000 acres received the benefits of aerial application. In 1951 this increased to 35,000,000 acres and in 1952, 70,000,000 acres. With these results, there can be no denying

that the use of aircraft in agriculture has not only come of age, it has developed into one of the fastest growing and most necessary factors in the production of food and fibre crops in this country. In one area alone in 1950, the Cotton Belt, agricultural experts estimated that the use of aircraft saved some $28,000,000 worth of cotton. Without aircraft application, this could easily have been a loss, with resulting adverse effect on the economy of the area in general and the cotton growers in particular.

One of the greatest problems facing aerial applicators has been that all aircraft used for this work are conversions or adaptations of existing types. Not until recently has anyone tried to develop and build an aircraft specifically for aerial application. At the present time, several aircraft companies are engaged in solving this problem, and one of the most interesting results has been the development of the Air Tractor by the Central-Lamson Aircraft Company of Yakima. This aircraft is presently in production, and many readers may have seen the pictures of the Air Tractor in action in Life Magazine a few months ago. This development, and the recognition of the need for a purely agricultural aircraft is further confirmation of the fact that the aerial applicating industry has indeed come of age.

Butter Purchases Rise—Butter purchases by American households rose to over 60 million pounds during a 4-week period in September, according to the U.S. Department of Agriculture. This represented an increase of more than 5 million pounds, or 10 per cent, over purchases in the comparable period in September 1953. For the period April-September 1954, butter purchases for household use were almost 7 per cent larger than in the corresponding period a year earlier.

Milking Machines Increase—The U.S.D.A. reports that since 1942, the number of farms with milking machines has increased by about 180 per cent, while the number of field-type cornpickers has increased about 40 per cent. The number of grain combines on farms in 1953 exceeded 900,000, compared to 375,000 in 1945 and only about 69,000 in 1930, according to the report.



AN ADJUSTABLE CATTLE FEEDER

This mechanical cattle feeder does a two hour job in twenty minutes. . .

Condensed from Electricity on the Farm

Donald K. O'Brien

THERE is no question about it," says Dwight Wise of Fremont, Ohio. "We save lots of labor with our mechanical system of feeding chopped hay silage to our steers. We now do easily in 20 minutes what used to be two hours of hard labor. We just stand and watch it work while the steers are fed."

Wise's silo is equipped with an unloader. It tosses silage onto a cross conveyor elevator 10 feet long, which in turn delivers the silage to a feed bunk 56 feet long. This conveyor is also used to move corn from the wagon to the storage elevator at cribbing time. In this bunk is a slowly moving drag that distributes silage from one end to the other. Thus one man can throw the switches and watch the 55 steers get their silage. Or, he can be doing other jobs while the motors do their work in just 20 minutes.

Before this system was installed, it took one man an hour to throw down enough silage by hand for one day's feed. Then it took another hour of steady walking to carry 50 to 60 baskets of silage to the bunk.

The bunk was installed in a loafing shed 60 by 26 feet along the outside wall of the barn. It is 18 inches wide inside, 8 inches high in front, and 14 inches high on the back side. The Wises built it in their farm shop.

The entire bunk is suspended from the ceiling by chains. They are fastened opposite each other in the bunk and are attached to a 1¼" pipe secured to the ceiling so as to allow it to turn.

The bunks can be raised and lowered by a crank connected to the pipe by worm gears from an old corn binder. This is located in the center of the bunk so that one crank readily raises the whole bunk in one operation. As the manure piles up

Reprinted by permission from Electricity on the Farm, New York City, November 1954

and the cattle grow larger the bunk is raised. Usually it is raised once a week. Thus, the bunk is always at the right height for the cattle to eat. For cleaning the shed with a tractor-mounted manure loader, the bunk is cranked up to the ceiling.

Inside the bunk are two parallel No. 55 steel link drag chains cross connected with 1 inch square wooden bars that carry the silage. A partial floor, built 8 inches below the bottom of the bunk, is provided for the drag chain's return. Power for the drag chain is supplied by a ¼ hp electric motor geared down through a wagon unloader mechanism mounted on a shaft at one end of the bunk. During the harvesting season, the unloader is used on wagons.

Dwight Wise and Sons say there are a number of reasons why they like this mechanical system of feeding:

1. It saves time and labor and takes the work out of feeding.

2. It saves silage, for the cattle do not waste fluffed up hay silage. When silage is thrown down by hand, it usually is in chunks. In the bunk, a steer will shake a chunk and lose part of it in the manure.

3. It also serves as a grain feeder.

4. The bunk is always clean. As the drag moves along, it cleans out all the dirt in the same way a barn cleaner cleans a gutter.

5. Since the bunk can be raised as the manure pack builds up, the shed needs cleaning just twice a year.

6. The system was inexpensive to build. Total cost was only $124 for the bunk.

Further Cuts Seen In Wheat Income

Further cuts in Oregon farmers' incomes from wheat—already down sharply from last year and the year before—seem almost certain, says M. D. Thomas, extension agricultural economist at Oregon State College.

Production controls and price support provisions of the present federal farm law could result in the 1956 crop bringing little more than one-fifth less than was expected from 1954 production, the economist explains.

Regardless of what happens to supplies, wheat supports almost certainly will never again provide the purchasing power they have made possible in recent years, Thomas continues. By 1960, support prices for wheat could be around 70 cents a bushel under the 1954 level if conditions remain as they are now.

Oregon State College

SUPERPHOSPHATE AT PLOW DEPTH FOR ASPARAGUS

"Super" boosts asparagus yields. . .

Condensed from New Jersey Farm and Garden

Raymond H. Battle

ASPARAGUS growers on a recent extension service-sponsored field trip in Gloucester County, N. J. went home with plenty to think about. Perhaps they were most intrigued with a fertilizer attachment for a subsoiler that delivers superphosphate and lime to the root zone, but they learned something about irrigation, contour-planting, weed control, dieback and rust disease, too.

Charles Nissley, extension specialist at Rutgers, 15 or more years ago came to the conclusion that a lot of trouble with the growing of asparagus—including drought—could be minimized if plants could develop a really healthy root system.

Since superphosphate stimulates root growth, he reasoned that some method ought to be found of getting it deep down to the root zone, at the same time correcting for acidity. The way to do this, he found, was to apply lime with the super, or in a separate operation, maintaining a pH of 6.5 or better. "Let the pH get much below that and the roots couldn't use a carload of super," he cautioned the growers. "The soil would lock it up."

Next came the problem of putting the superphosphate 16 to 18 inches below the surface, so he rigged up parts from an Oliver No. 2 subsoiler and a fertilizer hopper, running the distributor down behind the subsoiler. His machine now has been adapted for commercial use, supported by the experience of at least two Gloucester County asparagus growers who built their own.

Eight-Inch Extra Growth

Here's an example of what growers learned about the Nissley method on the Joseph Maccarone farm at Swedesboro: Last spring 1,000 pounds of superphosphate and one ton of dolo-

Reprinted by permission from New Jersey Farm and Garden,
Sea Isle City, New Jersey, November 1954

mitic lime per acre were applied in a band about 16 inches below ground level directly under the asparagus row—Nissley likes to get it in before the rows are broken out. Result: treated rows of seeding asparagus averaged eight inches taller than untreated rows. Prof. Nissley says the super will eventually leach, but that the lime apparently will last the life of the bed, which averages 20 years.

The 75 growers who toured the county noticed how contour-planting anchored down water and soil on the 120-acre Pat Licciardello farm, and on the Paul Fichera beds. Henry Sauselen, district soil conservationist, said that a combination of these advanced practices would do much to preserve and enlarge the county's nearly 3 million dollar asparagus industry.

On the Fichera farm, where Mr. Fichera cooperated with Dr. Howard Ellison, of Rutgers, on irrigation tests on asparagus, two inches of water was applied every two weeks in about four or five hours. The soil was very light and run-off was insignificant. Dr. Ellison said the added water increased the yield by one stalk per plant more than non-irrigated rows. Similar results were obtained on the George Freas farm in Salem County in another test, reported the Rutgers vegetable research specialist.

There was very little wilting of asparagus in the irrigated sections of these fields, observed Dr. Ellison, which leads him to believe that dieback may be caused primarily by heat and drought damage.

Dr. Ellison, reported that Canadian tests had established that irrigation could increase asparagus yields by as much as 500 pounds per acre. Boron has had no effect on asparagus when added to the soil, he added.

Weed Control

Chemical weed control tests being conducted on the Joseph Maccarone farm showed striking results. CMU (Karmex) applied at the rate of two pounds to the acre, at the start of and again after the cutting season, had controlled weeds up to the end of September.

Dr. George Blake, of Rutgers' soils department, had more than a passing interest in the "chemical hoeing" tests for another reason — soil compaction. He told the group that chemical weed control had reduced traffic over potato fields to one cultivation. He hopes the same will hold true for asparagus, where estimated traffic over one acre of asparagus is 160 miles a season. But so far, using various degrees of chemical and mechanical control, he has not been able to see any difference in

compaction over the methods used by Maccarone.

Apparently nothing new has developed to control asparagus rust. "This organism multiplies so rapidly that even destroying the brush in the fall, or using fungicides, seems to be of little value. Resistant strains still seem to be the best solution," Dr. Conrad Haenseler, Rutgers plant pathologist, told the group.

Spectacular Progress in Controlling Insects

Next time you or I find ourselves hitching up the insecticide sprayer, filling the bucket pump, or manning the flit gun, let's give a quick thanks to the science of entomology and to the men

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In our homes we no longer sleep under netting. Mosquitoes, flies, ants, roaches, bed bugs, and clothes moths are easy to control. Since 1912 quarantine barriers have protected us from foreign insect pests. Then, there is cultural insect control. Timely planting of insect-resistant crop varieties, stalk shredding, deep plowing, weed mowing, trash burning, sanitation are practices which help control insects. A less-talked-about but important weapon is biological insect control. This is pitting good insect against bad.

Florida Agricultural News Service

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Spectacular Progress in Controlling Insects

Next time you or I find ourselves hitching up the insecticide sprayer, filling the bucket pump, or manning the flit gun, let's give a quick thanks to the science of entomology and to the men and women who have built this science during the last 100 years. Let's thank them for the amazing progress they have made in insect pest control and for these modern bug killers that are as near as the farm supply, hardware or drug store.

This is an anniversary year for the entomologists. It was just a hundred years ago that the first organized effort toward insect control was begun in this country. Imagine what it would be like today without insect control. It's hard to picture a world where the bugs have free rein—to take what they will when they will.

For one thing, agricultural production would be less than half what it is today, because of the share that the bugs would claim. There would be no such thing as fresh fruits and vegetables on the market— neither in nor out of season.

Human disease would be rampant. Malaria, yellow fever, plague, typhus, dysentery, and relapsing fever are some of the terrible scourges that are pest-borne. Today's bugs are taking about 10 percent of our agricultural production—still too big a bite when we consider how our population is increasing, but a lot less than it might be.

We can read many signs of achievement in entomology in our ample food, good health, fine clothes, furniture and homes. In our homes we no longer sleep under netting. Mosquitoes, flies, ants, roaches, bed bugs, and clothes moths are easy to control. Since 1912 quarantine barriers have protected us from foreign insect pests. Then, there is cultural insect control. Timely planting of insect-resistant crop varieties, stalk shredding, deep plowing, weed mowing, trash burning, sanitation are practices which help control insects. A less-talked-about but important weapon is biological insect control. This is pitting good insect against bad.

Florida Agricultural News Service

NITROGEN—THE GROWTH ELEMENT

What nitrogen is, what it does and how it should be applied. . .

Condensed from California Farmer

NITROGEN is the growth element. It gives dark green color to plants, promotes rapid leaf, stem, fruit and seed growth. It improves the quality of most crops by increasing the protein content. Protein is necessary for all life, both plant and animal.

The element "nitrogen" is a colorless, odorless, inert gas that constitutes about 80 per cent of the air around us. It is in an unlimited quantity, since there are 35,000 tons of it over every acre of land and sea in this world. As an inert gas in the air, nitrogen is useless to plants. Some soil microorganisms, such as bacteria and fungi, can combine nitrogen from the air with other elements to form ammonia or nitrates. Some of these microorganisms such as the symbiotic bacteria that live with legumes must live on plants in order to fix this nitrogen.

In speaking of legumes, it is commonly said that they "fix" nitrogen. This is not true—only the bacteria living on legume roots "fix" nitrogen. Other nitrogen-fixing organisms live independently of living plants but they must have organic matter as a source of food and energy. Some nitrogen is also fixed by lightning and is brought to earth through rainfall.

All of these natural nitrogen sources are valuable to the farmer, and should be utilized to their fullest extent whenever they are economically feasible. However, with the present-day world's increased need for food and fiber, natural nitrogen fixation is inadequate in many cases. Therefore, synthetic nitrogen, produced by large chemical plants, has become an important and economical source of this material for use in modern agriculture.

The following are the most common forms of commercial nitrogen:

Reprinted by permission from California Farmer, Los Angeles, California, November 1954

	Per cent Nitrogen
Ammonium nitrate	33.5
Ammonium sulphate	21.0
Anhydrous ammonia	83.0
Urea	45.0
Cal-nitro	20.0
Sodium nitrate	16.0
Nitrogen solutions	20.0 to 41.0

Growers often ask the question, "Which is the best source of nitrogen for me to use?" To answer this question, one must know something about the form that plants prefer and also what happens to each source in the soil.

Most growing plants prefer the bulk of their nitrogen as nitrate. However, some plants, such as rice, appear to prefer ammonia nitrogen. Many young plants will use ammonia nitrogen efficiently, but the greater portion of nitrogen is used by the crops in the nitrate form.

Ammonium nitrate is half ammonia nitrogen and half nitrate nitrogen. Ammonium nitrate limestone is also half and half. Anhydrous ammonia and ammonium sulphate are 100 per cent ammonia nitrogen. Sodium nitrate is all nitrate nitrogen. Urea is considered a synthetic organic source that is water soluble. Applied to the soil, urea becomes ammonia nitrogen. This transition in the presence of proper enzyme is very rapid and so, for all practical purposes, it is an ammonia source.

The several sources mentioned above boil down to only two forms which need be considered; ammonia and nitrate nitrogen. Ammonia, when applied to the soil, soon combines with the clay particles in the soil. Combined as such, ammonia cannot move in the soil. However, in the presence of proper bacteria, moisture, air and suitable temperature, it is rapidly changed to nitrate nitrogen. The time required may vary from a few days to several weeks for an application of ammonia nitrogen to become nitrate nitrogen.

The lowest soil temperature at which nitrification takes place is just a little above freezing, about 36 degrees Fahrenheit. At this low temperature the nitrification rate is very slow but as the temperature increases, the rate becomes more rapid. At 45 degrees F., the nitrification rate in some soils is sufficiently rapid to change the applied ammonia nitrogen to the nitrate form in about four weeks. Nitrification reaches its most rapid rate at temperatures between 70 and 90 degrees F., and tapers off above that. Different soils have different nitrifying rates. Compacted, poorly aerated, water-logged soils will nitrify more slowly than those soils in a healthy condition.

In areas of heavy rainfall or where regular surface irrigation is practiced, nitrogen should be

applied as nearly as possible to the time of crop utilization. It will make very little difference which form the farmer uses, since this would be the time of year when the soil is warm; thus nitrification will be rapid. Soils which permit slow downward movement of water will lose very little nitrogen in the leaching process. On these soils, the time of application makes little difference. In porous, sandy soils, however, loss of nitrogen from leaching may be costly. In these soils, fertilization applications should not be made until the plants need this extra food.

Census Information Important For Farm Planning

Census information provides the benchmarks on which practically all methods of making agricultural estimates are based. It is also useful planning most farm programs designed to improve farming and farm living and in measuring results of programs already under way.

In the sixteenth Census of Agriculture, it is highly important that farmers furnish census enumerators accurate information in reply to census questions. There will naturally be a good many questions, but the information to be obtained is needed in properly planning for the welfare of farm people. It will also affect industry and business, since business firms use census information as a guide in locating factories, organizing sales campaigns, estimating future volumes of business, and developing new machinery and products.

Farmers will be asked to furnish information about the acreage, yield, production and sales of all their crops, such as cotton, tobacco, peanuts, fruits, vegetables, forestry products, etc. They will also be asked about their income from the sale of live animals and poultry, as well as from milk, butter, eggs, meat, and other farm products.

The census will include an inventory of livestock on farms, the number and kind of farm equipment on the farm, including automobiles and trucks, and certain equipment in the homes. It will also include information regarding acreages devoted to various uses such as cropland, pastures, and woodland; the value of the land and buildings; and expenses involved in the operation of the farm.

Information will also be obtained regarding the number of people working on the farm and the number who live on the farm and work elsewhere. *Clemson Agricultural College*

Grass and Water Keep Farm Safe

Lakes and ponds, beef and sod, are a successful combination on this 500-acre watershed. . .

Condensed from Soil Conservation

M. B. Brissie, Unit Conservationist, Soil Conservation Service

DAVE Cameron is water-minded. He farms in the Delphia section of York County, South Carolina. He doesn't figure to lose many drops of water or very much topsoil from his 650 acres. With the recent completion of a 15-acre lake, on which he got help through the Catawba Soil Conservation District, Dave now has 10 ponds and lakes on a 500-acre watershed. Thus, he has stock water, fish, and irrigation water, and protection against rainfall shortages such as have been frequent the last few years. Some 35 acres of his land are under water.

The drainage area feeding Dave Cameron's lakes is sodded with grass and clovers for the most part, allowing very little soil to leave his fields. Cultivated land in the area is terraced and under improved crop rotations. (According to research findings at the Soil Conservation Experiment Station at Watkinsville, Ga., good pasture sod is next to forest cover in preventing soil loss. Cultivated land (Class III) planted continuously in cotton lost 20 tons of soil per acre, but where a winter cover crop was used preceding cotton the loss was reduced to 9 tons per acre.)

Cameron really doesn't give the water that falls on his farm much chance to escape. If the sod and improved cropping practices fail to absorb the rainfall, then it "walks" down the slopes and is impounded in one of his series of ponds. At the first sign of drought in summer, this water is pumped back on the land to start the cycle again. "Whenever my fertilizer is washed into my ponds, I don't figure I lose it, as I will pump the water back on the land, and if I don't need to do that, then it will produce more fish," Cameron reasons.

Soil and water conservation is

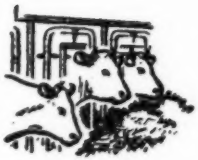
Reprinted from Soil Conservation, Washington, D. C., December 1954

one of Cameron's pet concerns. He is one of the pioneer conservation farmers in York County, having been interested in the "doings" on the Fishing Creek watershed in 1934-35, where the government then was furnishing technical assistance as well as labor and materials in getting large-scale conservation underway. Even though the Cameron farm was not in the Fishing Creek watershed, he invited technicians and engineers of the Soil Conservation Service to assist him in drawing up plans for work on his farm. He supplied all labor and materials, to get the job done.

During those years Cameron planted 125 to 150 acres of cotton on his farm and produced around ¾ to 1 bale per acre. By terracing and the use of soil-building rotations, he now produces, during an average year, from 1¼ to 1½ bales per acre. He attributes much of the increase to the use of annual lespedeza following small grain, and to its return to the soil. Cameron, during those early years, grew as high as 300 acres of annual lespedeza for seed.

Around 10 or 12 years ago Cameron began his two-armed system of farming—crops plus livestock. With the increase in numbers of beef cattle, he gradually shifted the use of his land from cultivated crops to hay and pasture crops. He now has 100 brood cows and is replacing all high grades with purebreds. Cameron believes that as fine cattle can be produced on grass in York County as can be grown in the grain country. Two things are necessary, he says, "First, you must have a good animal, and second, you must have grass with the proper elements in it, and this comes through putting the proper kinds and amounts of fertilizer on the grass." Cameron has his soil tested regularly with assistance from the county agent and his staff, and needed fertilizing elements are added.

"When you get the plants and fertilizer on the land, the only other things needed are water and sunshine," Cameron said. Here, again, he plays the game by his own rule book and does not use sprinkler irrigation but pumps water to his fields through open pipe and "floods" his fields. A 16-year-old boy is his irrigation personnel, moving the pipe to another portion of the field when the ground becomes soaked. For one section of his pasture he uses a small electric motor to pump water through underground mains. These mains are "tapped" at certain locations for irrigation of adjoining pasture areas. Cameron figures it costs him approximately $1.25 to $1.50 per day to operate his 5-horsepower electric pump.



DAIRYMEN DOUBLE PRODUCTION WITH SPRINKLER IRRIGATION

These dairymen now milk 70 cows where they milked 38. Figures show irrigation brought an 83% increase in income. . .

Condensed from Hoard's Dairyman

McCall Smith

THE value of sprinkler irrigation has been proved in the Smith River dairying community of Del Norte County, California. It started in 1939 when Bob and Paul Maris had courage enough to undertake irrigation of 14 acres with sprinklers.

At first some of the Smith River folks frankly said that the Maris partners had lost their reason, spending hard earned money sprinkling pastures. "Why, Del Norte County gets from 65 to 100 inches of rainfall a year and this new-fangled idea costs $100 an acre! Takes a long time to get that back jerking milk out of a cow one squirt at a time."

Then W. D. Pine, University of California farm advisor, reported to the Del Norte County Dairymen's Association annual meeting in 1944 that increased forage from irrigation at the Maris dairy had increased the income 83 per cent. He had the figures to show how it had paid off. Del Norte county dairymen have since purchased $100,000 worth of sprinkler irrigation equipment.

Bob and Paul Maris have increased their irrigated pastures to 70 acres and plan to irrigate 26 acres more this year. June, July, and August are the more important months in forage production at Smith River and these are dry months there, sometimes 60 days without a drop of rain. Irrigation has enabled these progressive dairymen to milk 70 cows where they formerly kept 38. Production per cow has increased, also.

Like most Smith River dairies, the Maris farm is slightly rolling and the soil is shallow in places. This means grading

Reprinted by permission from Hoard's Dairyman, Ft. Atkinson, Wis., August 10, 1954

the land would be neither practical nor economical. With sprinkler irrigation, they would have use of the land the first year. Also, the right amount of water could be applied to their light soil with greater efficiency and less waste.

When Bob and Paul Maris planted their first 14 acres of irrigated pastures in 1939, they were farming 140 acres of their home place and 80 acres rented from a neighbor. Next year they gave up the 80 acres of rented land when the pastures produced enough forage for their herd. They had increased their irrigated pastures to 22 acres by 1944, and careful records of costs and production had been kept all that time.

Here are some of the figures farm advisor Pine presented the dairymen's association:

Equipment to irrigate 22 acres cost $1,300. This consisted of one hand-dug well, a 2½-inch high-pressure pump of the centrifugal type connected directly to a 15 horsepower motor. One permanent 6-inch pipe line ran through the center of the field. Either direction from the main line, two sectional 3-inch aluminum pipe lines fed 15 sprinkler heads on each line.

The figures show that each time the portable pipelines were moved two men were required for 20 minutes. Equivalent of two inches of water on the land was applied at each setting, requiring four hours of sprinkling. The portable laterals were moved 28 different times to cover the 22 acres.

Here is the pay-off. In 1938 before taking to irrigated pastures, Bob and Paul Maris were feeding 38 cows that averaged 306 pounds of butterfat per year. In 1944 the home farm was supporting 49 cows that averaged 415 pounds of butterfat. Of course, the Maris dairy was in the Dairy Herd Improvement Association all this time—adding better bulls, culling rigidly, and feeding according to production. Nevertheless, much of the increased production per cow came from more and better forage. These were the results that started other Smith River dairymen irrigating in dry months.

At present the Maris partners are irrigating 70 acres with two plants, one 2½-inch and one 3-inch pump, each with 15 horsepower motor. Early in the season the water stands in the wells just below the pump, and the lift is never more than 12 feet at any time during the irrigation season. The main line that runs the long way of the field is 6-inch black pipe with outlets every 60 feet for connecting the portable laterals.

One pump supplies one lateral with 19 heads that spread 17 gallons per minute each. The

other pump feeds two laterals with 33 heads that supply 11 gallons each per minute. All laterals are 3-inch aluminum pipe in 20-foot sections with lever-type quick-couplers.

The laterals are connected and disconnected in a matter of seconds without any special tools. The male end of the pipe bearing a rubber gasket is placed in the female end of the joining pipe by the irrigator. As the lever is thrown forward it engages a lug welded on the adjoining section and forces the gasket tight and the sections are connected.

The laterals are moved twice in a 12-hour day. Two men and a boy change each lateral in 12 minutes. One man would take 40 minutes to do the same job. He can easily carry 40 feet of the aluminum pipe at one time. All time saved in moving the laterals means more time for actual sprinkling.

The sprinkler heads are a full circle sprinkler. With this equipment, they are able to irrigate a swathe 60 feet wide each setting of the sprinklers. This sprinkler rotates slowly, driven by an oscillator arm actuated outward by the stream and brought back through the stream by a torsional spring. This causes an impact that propels the rotating member forward. Thus the sprinkler moves slowly but steadily in a complete circle.

Total cost of all equipment for irrigating the 70 acres (pumps, motors, main pipe line, portable pipe, and sprinklers) is $5,200. Electric energy for the pumps has cost as high as $500 and as low as $350, depending on length and dryness of the season.

All forage for 70 cows and young stock, pasture and hay, is produced on the Maris farm. They have never bought a single load of hay.

Seeding mixture for the irrigated pastures was 5 pounds of Ladino clover, 10 pounds of English rye grass, and 5 pounds of alsike clover. The pastures are fenced so that the cows can be rotated every 10 days as the fields are irrigated. About every other year aggressive and vigorous native grasses, such as velvet grass, tend to take over the legumes. Then a Swiss harrow, a spring-tooth type harrow with chisel teeth, is used to thin out the grasses and give the legumes a chance. Then they reseed the legumes. About 70 acres of dry land pastures supplement the irrigated acreage. These are a mixture of alsike, rye grass and subterranean clover.

Bob Maris says the story of irrigated pastures is not complete until he explains about their manure pit. Before building

the pit, these dairymen were able to fertilize six acres with the old manure pile and a spreader. Now they cover 24 acres with 60 per cent less labor required to clean the barn and spread the manure. They fill the big pit, 40 x 16 x 6 feet, three times a year, covering eight acres each time it is emptied. Two days are required to empty the pit and spread the manure. Total cost, including the wagon for spreading the liquid manure, was only $750. Three hundred pounds of superphosphate per acre added to the manure multiplied the results on this particular soil.

Here is where the sprinkler irrigation makes use of the manure pit possible. After applying manure the pastures are offensive to the cows and they will not graze them. The Marises overcome this objection of the animals by following the manure spreader immediately with sprinkler irrigation.

The Agricultural Capitalist

The average farmer probably doesn't think of himself as a "capitalist," particularly when he is having a little bit of an extra struggle to make ends meet. But as a matter of fact, agriculture is even more "capitalistic" than industry itself. Farming takes more capital in proportion to the number of workers involved than industry does. The average investment per farm worker is now about $20,000, as compared to an average of $10,000 per industrial worker. In some sections, the investment per farm worker may average several times as much as the national average of $20,000.

That being the case, it is easy to see why the business management side of farming has become just about as important, so far as the financial success of the farmer is concerned, as the crop production side. It isn't enough to know how to handle machinery and animals, how to prepare the land, how to plant, how to fertilize, how to cultivate and how to harvest. The farmer also has to know how to market his crop, how to plan his investments in land, machinery and buildings, and how to handle his accounts so he can know his profit or loss on every farm operation.

Today we not only have a new kind of agriculture, but a new kind of farmer. He is still a worker—at least, he'd better be if he wants to keep on farming—but he's also a capitalist and a businessman. It's harder to be a good farmer than some of us in town may think.

Louisiana Extension Service

Mastitis Control

A ten year program of observation and controls. . .

Condensed from Science for the Farmer

J. J. Reid, Professor of Bacteriology

WORKERS in dairy extension and Pennsylvania's Department of Veterinary Science and Bacteriology cooperating in a 10-year program of observation and research in causes and control of mastitis recently completed their studies.

During the course of this work, 46 herds including more than 2,000 cows were subjected to investigation. This investigation of causes and controls of mastitis was far too broad in scope to report in a brief item, but certain findings are of especial interest:

(1) A majority of cows in the University Jersey herd found suffering from udder trouble during their first two lactations were daughters of Imported Dreaming Cowslip, a sire which left a trail of mastitic offspring wherever he went. Similarly, those cows in the Holstein herd which suffered most severely from mastitis belonged largely to certain blood lines. The Brown Swiss and Ayrshire herds were relatively free from this disease. Blood lines in the Guernsey herd were not sufficiently well defined to indicate tendencies.

(2) During the war years, the efficiency of the dairy barn help at the University barns gradually declined and numbers of cases of mastitis rose. Poor milking practices and disregard for the comfort of the cows seemed to cause the trouble. When the war was over and more dependable help was obtainable, mastitis became less prevalent.

(3) In addition to poor milking practices, equipment on many farms was found faulty. In all cases where the vacuum pressure and the pulsation rate of the milking machine were adjusted, worn rubber parts replaced, and a managed milking program was initiated, the mas-

Reprinted from Science for the Farmer, Pennsylvania State College, State College Pennsylvania

titis level of the herd was lowered.

(4) Udder trouble in certain dairy herds was found to afflict cows occupying drafty stalls. In other cases, outbreaks occurred where milking herds were allowed to lie on cold ground out of doors at night too late in the fall or too early in the spring. Udders of high producing cows which were allowed to come in contact with cold bare ground or concrete were found in danger of congestion.

(5) In numerous instances, cases of mastitis could be traced directly to known injuries of udder or teats. Treatment by persons other than veterinarians often led to serious udder trouble particularly when udder infusions were attempted.

(6) Cows should be prepared for drying by reduction of feeds which stimulate milk production and in some cases by lowered water supply. Regular milking should continue until the milk flow has been lessened. Susceptibility of the udder to injury from chill winds, drafts and cold floors was found greatest immediately before and after calving.

(7) Individual cows in which mastitis could be induced by liberal feeding of concentrates were found in herds on farms. Later investigation revealed the importance of sound judgment in feeding dairy animals according to their ability to produce. With certain cows, mastitis reappeared with regularity within a few days whenever they were fed too freely.

Practices of Doubtful Value in Mastitis Control

In recent years rigid sanitary recommendations for mastitis control have been fashionable in dairy circles. Widespread observation coupled with extensive laboratory tests have failed to show that these practices have practical value in herd management, however necessary sanitation may be in the production of clean milk. In general, such recommendations have been:

1. Subject carefully drawn milk from all animals to laboratory examinations.

2. Classify all cows in the herd on the basis of these findings.

3. Eliminate or segregate all shedders of Streptococcus agalactiae.

4. If segregation or disposal of all cows subject to mastitis is impractical:

(a) Place nonmastitic animals at the head of the milking line and those chronically or currently suffering from the disease at the end to be milked last.

(b) Make routine cleansing of stalls and gutters with disinfectant a daily chore.

(c) Use a bactericidal agent on udders and tests before milking.

(d) Apply disinfectant to teat cups each time before use.

Although these practices seem based on sound reasoning, they have brought slight if any relief from mastitis even when rigidly enforced.

Practices Found Helpful in Mastitis Control

Results of a statewide investigation of causes and controls of mastitis indicate clearly that serious outbreaks of this disease can be prevented by means available to most dairymen. Individual cases can be reduced to an almost negligible number but not by any single means nor without careful study of conditions and some sacrifices on the part of the herdsman. Practices found helpful in controlling udder trouble in general are:

1. Removal of susceptible blood lines, male and female, from the herd. Physical tendencies toward mastitis evidently are heritable.
2. Employment of dairy barn helpers who are interested in their work and are considerate of cow comfort.
3. Proper use of milking equipment that is kept in good repair.
4. Prevention of exposure of the dairy herd to low temperatures and cold winds out of doors, and to drafts in stables. Keep cows from lying down on cold ground, bare concrete floors, or rough surfaces.
5. Alert awareness of the dangers of injury especially to udders and teats.
6. Special care during drying, calving, and immediately after calving.
7. Reasonable feeding of concentrates.

Amount of Corn in Corn Silage

The amount of corn in corn silage will vary with the variety planted, stage of maturity when harvested, and the amount of damage caused by drought.

At the Michigan Experiment Station, a good hybrid corn adapted to grain production yielded 11.6 tons of silage per acre. The yield per acre in leaves and stalks was 7.6 tons and in corn grain, 55 bushels. The yield per acre of total digestible nutrients was 5,084 pounds, of which the cobs and stalks made up 2,626 pounds and the corn grain 2,548 pounds.

Although a silage corn harvested at an immature stage yielded 16.8 tons of silage per acre, the yield of total digestible nutrients was only 3,744 pounds per acre of which the cobs and stalks yielded 8,470 pounds and the corn grain, 273 pounds.

The results of this Michigan experiment indicate that an allowance should be made for the grain in corn silage when feeding cows for milk production. Corn silage, made from corn that will produce a good yield of corn (50 bushels), will furnish about 1 pound of corn grain in each 7.5 pounds of silage fed. In other words, a cow eating daily 45 pounds of silage would obtain 7.5 pounds of corn grain. The leaves and the stalks in this amount of silage would be equal to 10 pounds of hay.

HELP YOUR TAX COUNSELOR

Keep accurate and complete records, assemble related data before tax filing deadline. . .

Condensed from Everybody's Poultry Magazine

Harold J. Ashe

EVEN the most skillful tax counselor cannot do full justice to a poultryman if the client fails to reveal all pertinent facts. This is especially true in the case of counsel employed only for the purpose of preparing an annual tax return. However, even an accountant employed on a year-around retainer basis may be kept in ignorance of some non-business facts necessary to reflect truly taxable income and compute the tax.

In the preparation of a poultryman's individual income tax return, counsel will be obliged to make certain decisions and exercise choices in the interest of his client. Denied some pertinent facts, the wrong decisions and choices may be made through no fault of counsel.

Information Must be Complete

The completeness of the facts with which counsel works is the responsibility of the client. Therefore, it is wise for a poultryman not only to keep accurate and complete records throughout the year, but to assemble certain related data long before tax filing deadline. The longer this is delayed the greater the likelihood that certain items will be overlooked and that a poultryman will penalize himself, tax-wise, by his oversight.

A surprisingly large number of poultrymen do not have a complete schedule of all depreciable assets. Even though poultrymen, generally, are aware that depreciation charges increase their costs, and thus decrease income subject to tax,

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many depreciable items fail to show up in depreciation schedules of tax returns.

If a depreciable asset fails to appear in the income tax return for the year in which the asset is acquired this oversight very likely will recur each succeeding year for the duration of its useful life. Thus, not only is a poultryman penalized for one year but for every year.

For example, if a certain depreciable asset at the time of acquistion cost $250, total tax saving will amount to $50 during its useful life if a poultryman is in the 20 percent tax bracket. Failing to depreciate this item, his taxes will total $50 more than otherwise. Considering net farm earnings for a year's labor and efforts, such a loss is a luxury few can afford.

Accurate Inventory is Necessary

Therefore, long before seeing tax counsel, a poultryman may well spend a little time making a physical inventory of all depreciable assets. Checking this against his depreciation schedule in his last tax return may indicate one or several oversights. Walking around the farm with tally sheet in hand may be highly profitable, tax-wise.

In this connection, it should be noted that depreciation is not lost on the remaining useful life of an asset, even though past depreciation has not been taken. However, past depreciation is lost, and only remaining depreciation may be taken in subsequent returns. Thus, if an undepreciated asset has 10 years of useful life and five years of depreciation has not been taken, only the remaining five years may be taken in the ensuing five years. This will be at the rate of 10 percent a year, based on initial cost.

If a substantial part of available depreciation has not been taken in past years, it may pay a poultryman to file amended returns for those years within the statute of limitations. If tax savings are substantial by filing amended returns, this will more than justify the fee of a tax counselor.

In the current year, a poultryman can help his counselor materially by keeping track of all newly acquired depreciable assets, their date of acquisition and cost. Otherwise, these too, may never show up in the depreciation schedule. These include equipment as well as new buildings.

Figuring Casualty Losses

Expenditure of a little time in reviewing the year to date in terms of casualty losses may be worthwhile. And, for the balance of the year such losses should be recorded at the time occurring. These losses from fire, theft, earthquake, flood, etc., are deductible to the extent not

recovered from insurance. A memorandum should be made indicating the nature of the loss, its cause, and the reasonable value of the loss at the time incurred, less insurance recovery, if any.

Poultrymen who are allergic to record keeping, should resolve to keep an itemized record of every conceivable farm expenditure, including out-of-pocket expenses which are often forgotten.

Often, short form income tax returns or returns taking only the standard deduction are filed when the facts would warrant filing a return itemizing personal deductions. Here, again, counsel should be supplied with an itemization of all personal deductions so he can make a decision based on the facts as to which return to file.

Every category of personal deduction should be recorded, preferably at time it is made. These include medical expenses, contributions, taxes and interest. If there is any question as to the deductibility of an item, record it anyway and leave it to counsel's judgment.

For example, contributions may be "in kind" as well as cash if made to organizations recognized by the U. S. Treasury Department.

In figuring taxes for the year, a reasonable estimate should be made of city and state sales taxes paid. The state income tax should not be overlooked.

In calculating interest, deduction of interest is often overlooked on time-payment purchases. A new ruling now recognizes such charges, regardless of how styled, as interest, in fact. Interest paid on money borrowed on insurance policies is often forgotten.

Include Medical Expenses

Medical expenses not only include doctor bills but dental expenses, medicines, crutches and canes and wheel chairs and similar accessories, nurses' salaries and hospital charges as well as travel costs to get medical care. Eye glasses are deductible, as are fees paid to Christian Science practitioners.

It is doubtful if any other farm activity, hour for hour, will be as rewarding as the small amount of time necessary through the year to reconstruct past and record future outlays of a tax saving character. Only with all of the facts can a poultryman be given every tax advantage to which he is entitled by law.

One of the basic principles of livestock disease management is feeding a well-balanced diet and plenty of clean water.

Turkeys Can Be a Profitable Sideline

Turkeys have proved themselves on this beef farm. . .

Condensed from the Breeder's Gazette

Milton R. Dunk

FRANCIS Baker of Ogle County, Ill., has farm management records to prove that turkeys can be a real income booster on a livestock farm. His records show that he makes more per hundred dollars worth of feed fed to turkeys than he does on the same amount fed to beef cattle or hogs.

Baker has 240 acres on the home farm and rents an additional 156 acres. He now feeds 60 head of cattle—expects to feed out 120 steers next year—and produces 500 head of hogs annually. Then he tops things off by raising and marketing about 1,600 turkeys each year.

Turkey raising is not new to Baker. His family has had turkeys since 1914. Back in 1914, the first turkey venture in the Baker family was a complete failure. Turkey hens were used for brooding a few turkeys, but none of the birds lived.

It wasn't until 1931 that the Bakers raised more than 100 turkeys a year. Their turkey business has gradually increased and this year, 1,350 Broad Breasted Bronze and 250 Beltsville White poults were started around the first of May. The poults were purchased from a commercial turkey hatchery and put into battery brooders on the second floor of a new 30 x 60 ft. general purpose building. An oil stove is used in the brooding room to provide additional heat.

When Baker's poults are about two weeks old, they are placed on the floor covered with a commercial litter. At eight weeks, the birds go on an alfalfa-brome grass range. Baker rotates his turkey range to keep disease problems to a minimum.

Years ago, turkey growers were plagued with the dreaded blackhead disease. Often 75% of a turkey flock would die from blackhead in one year. Drugs have now been developed to control this disease and Baker

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gives his turkeys Enheptin every three weeks after the birds are 10 weeks of age to prevent blackhead.

A number of portable 12 x 18 ft. shelters are used on the range to give protection from the sun and rainy weather. The shelters have roosts both over and under the roof. Baker has streamlined range feeding by having large self-feeders which will hold enough feed for a week. A hose fills large turkey waterers.

Poults are fed a commercial starter mash for the first six to eight weeks. Then they are given a turkey growing mash plus oats. Whole corn is added to this ration about September 1.

If you have ever raised turkeys, you know that they can make very rapid gains on a limited amount of feed. For the first eight weeks, the Bakers' Broad Breasted Bronze turkeys can produce a pound of gain on less than 2.1 pounds of feed. It takes about 75 pounds of feed to produce a 20-pound Broad Breasted Bronze.

Through the years, the Baker family found out that they could have extra income by dressing and marketing their own turkeys. Dressing operations start in October. Most of the birds are dressed out by Christmas time. The majority of the birds are sold at Thanksgiving and Christmas to local customers. A 300-bird capacity walk-in freezer enables the Bakers to sell birds the rest of the year to local restaurants, hotels, and individual customers. The 250 Beltsville Whites are raised for those who prefer a smaller turkey.

Birds are dressed on the first floor of the new general-purpose building. This modern home-dressing plant includes: electric stunning knife, automatic scalder, automatic picker, overhead track, and a stainless steel dressing table. The room has a cement floor with a drain which makes it easy to clean equipment and the floor with running water.

Baker would be quick to tell you that there are hidden profits in turkey manure. "Wherever we have turkeys," he points out, "the corn yields really step up." Turkey feathers from the dressing room are spread on the hills and plowed under.

Turkey raising, today, is pretty much a standardized operation. The old time hit and miss is gone. You can be successful with turkeys if you follow a few simple rules. Just as in raising livestock, you need to consider breeding, feeding, general management, sanitation, and disease control for best results.

INCOME TAX SAVERS YOU CAN USE

Use this last minute check-list before you send off your completed figures. . .

Condensed from Successful Farming

Wayne E. Swegle and Hal Routhe

One of these long winter evenings you're going to take out your record book for the annual game—to see how much you can keep for yourself and how much you have to send to the Internal Revenue Service.

And as you separate your tax from your income—whether at home or in your lawyer's office—you want to use every **legitimate** means to leave yourself more income and less tax.

This report covers some of the most common mistakes that cost you tax money. Be on the lookout for them if you complete your return yourself; remind your tax adviser if he overlooks any of them. There also are some ideas here you'll want to keep in mind in your record-keeping next year.

Watch sales expense on breeding stock. Say you sold $1,000 worth of sows, on which you want to claim capital gains. A normal charge for trucking, commission fees, feed, and yardage might be $50. So the buyer gives you a check for $950. **Be sure you enter the full $1,000 as the sale price and enter the $50 under "custom work hired."**

Often farmers will enter the $950 figure as the sale price, not listing the selling costs. That means they pay tax on an extra $25 if they raised the sows themselves and are on the cash basis. Here's why: With capital-gains treatment, you pay tax on half of your gain. So if you enter $950, you pay tax on half of it, or $475.

Now, if you enter $1,000 as the selling price, capital gains means you pay tax on half of that, or $500. You charge off the $50 as straight expense. And $500 minus $50 is $450—the net amount you will pay tax on this way.

Tax saving—about $4.50.

Reprinted by permission from Successful Farming, Des Moines, Iowa, December 1954

Watch young sows that sell as butcher hogs. You may have sold fat sows this year when buyers weren't knocking down the price on extra weight. Then your sows may have been listed on the invoice as heavy butchers. If you kept these sows for 12 months and they had pigs, make sure you list them as **sows**, not butchers, on your tax return—and take capital-gains treatment on them.

To avoid missing these animals at income-tax-figuring time, list them on the invoice when you get it, so you'll have a record. Also show the change in numbers in your record book, so there'll be no question if your tax return is questioned.

Don't overlook items you pay cash for. It's easy to cash the egg check, then use the money to pay for some bolts, welding, and stock salt—then forget these expenses because you don't have sales slips for them.

Just remember that every dollar's worth of such expenses you forget to mark in your record books costs you 20 cents—even if you're in the lowest tax bracket.

Nonbreeding heifers, gilts, and ewes. Remember this when you sell nonbreeding gilts as fat hogs: If you kept them for breeding purposes, for at least 12 months, and found that they were nonbreeders, you **can claim capital-gains treatment on them.** Sames goes for heifers or ewes.

Remember, however, that an animal won't qualify for capital-gains treatment merely because it may be **suitable** for breeding or dairy purposes—or because it is held for **sale to others** who may use them for such purposes.

Dispersal sales. Say you held a dispersal sale this year, selling your entire herd of breeding stock. Then **all** the heifers, ewes, gilts, herd bulls, rams, and boars that have been **kept by you for 12 months for breeding purposes** will qualify for capital-gains treatment, even though the animals haven't reproduced.

Earnings of your children. You can pay wages to your sons and daughters under 19 years of age—and still claim their wages as business expenses and get their $600 exemptions. If you pay them over $600, they have to file a tax return.

Here's how to handle this arrangement: Set up a plan with your teen-agers, even to the point of drawing up a sort of agreement around the kitchen table. Such an agreement might set forth certain jobs the son or daughter is to do and what you'll pay him or her.

Here are limitations: The dependent must have full control over that money—you can't make him spend it for food or clothes which you normally are expected to provide. You can agree between you that he'll

save the money to start farming or for going to college. The pay must be reasonable and in line with the services performed in the farm business. And you must provide one-half of his support.

You should give this payment in the form of a check, so you have a receipt.

Depreciate breeding livestock. Often, livestock breeders overlook the opportunity to list purchased breeding livestock on their depreciation schedule. This can be costly, because such depreciation is 100 percent deductible.

Here's how: Say you buy a 2-year-old heifer for $240. You put her on a 10-year base for depreciation. That means she has 8 years left— **so you deduct $30 a year for the depreciation on her.**

Here's another saving: Say you keep this heifer until she is 8 years old. You have depreciated her down to $60. Now you sell her for $120. You only pay tax on $30 of that selling price —because you claim capital gains on this sale of a dairy animal. Your gain is $60—half of that is $30.

Grain storage fast tax write-off. The time of decision on whether or not you want to take the fast tax write-off is at hand if you built or remodeled a corncrib or granary this year. And there are some points that need to be emphasized.

You could pay the same tax eventually, whether you take the fast write-off and depreciate the building over a 5-year period or depreciate it over the normal 20 years or so. The fast tax write-off concentrates your depreciation deduction, and thus the tax-saving, into fewer years.

If you expect to be in a higher bracket in a few years, it may pay you to take the longer depreciation base. On the other hand, the fast write-off helps you if you need the tax-saving in the next 5 years.

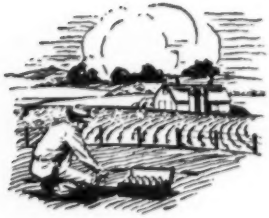
Cattle Bruises Are Costly

Losses resulting from bruises, injuries, and death in shipping cattle to market add up to many millions of dollars each year. Tests conducted showed that one out of every 15 cattle marketed is so badly bruised that the average value of the meat lost per injured animal is about six dollars. Yet much of this loss can be prevented by more careful handling, both on the farm and while hauling cattle to market by rail or truck.

Extension Service—Louisiana Agricultural College

Drought: What You Can Do About It

An interesting study of what drought and heat do to crops and how the results of such disasters can be mitigated. . .



Condensed from
Better Crops With Plant Food
Dr. William A. Albrecht
Dept. of Soils, University of Missouri

WHEN we keep breaking heat records, and when droughts are being classified as national emergencies, it seems appropriate to make some observations on the crop disasters under what is commonly called "drought." We may well study some of the factors concerned beside the weather records and the meteorological parameters. In place of using these extended rain-free periods as the alibi, perhaps a more complete analysis of the situation will exhibit the soil as a contributing factor. Perhaps through it there may be some means of mitigating the disastrous effects associated with what is commonly called "drought."

Some geographic characters of the droughts suggest that they are highly continental. Within larger land bodies, the unexpected weather comes more often. That is another way of saying that the weather records for certain short periods may vary widely from the climate, or from the average figures for extended times. As an illustration, Columbia, Missouri, had an annual rainfall in 1953 of only 25.12 inches in place of 39.33 inches, or what was the average of over more than a half century, and what was considered "the normal." The rainfall of the year 1953 was 36.1% below normal (assuming that "the normal" hasn't

Reprinted by permission from Better Crops with Plant Food
Washington, D. C., November 1954

gone lower, too). Accordingly, we may expect rainfall to go above normal by that figure some of these days. This, then, tells us that the continental effect may amount to that much above or that much below "the normal." It may be a variation totaling 72.2% of "the normal." Thus, we have had in 1953 what amounts to a continental effect of 72.2% or a new record of continentality as well as a new record of low rainfall.

Droughts, then, which involve both high temperatures and extended rain-free periods, become disasters because (a) longer periods between rainfalls represent soils dried to greater depths, (b) soils have less and less water evaporating from them directly and from the vegetation growing on them to spend the sun's heat in vaporizing it, and (c) the atmospheric temperature rises high enough thereby to injure the plant tissues because of the record heat wave.

Fertile Soils Make Stored Water Efficient in Crop Production to Lessen Drought Disaster

Sanborn Field with its shallow but fertile surface soil over the infertile clay subsoil, which characterizes the Putnam silt loam, illustrated well the drying of the soil to great depths of its profile. Water exhaustion of the soil to near the permanent wilting point of the crop went deeper and deeper as the corn roots, for example, were marching downward like an army for more water. On their leaving the fertile surface soil exhausted of water, and on entering the infertile subsoil for the stored water there, the lower leaves of the corn plants were "fired." This yellowing of those older leaves represents a case of robbing them of their nutrients for the survival of the younger, growing top leaves. It reports the decided shortage in delivery of fertility brought on by the transition of the roots from one fertile soil horizon to the other less fertile. But the growing leaves at the top of the plants did not necessarily wilt. That fact tells us that the "firing" is not due to a water shortage. It is the wilting of the growing tip of a plant that tells us when a plant needs water, as every woman keeping house plants knows very well.

Data from the Soil Conservation Research project at McCredie during the summer drought of 1953 showed the corn crop exhausting the soil moisture to a depth of 3.5 feet under the fertilized soils. The equivalent of only 1.04 inches of water was left in that entire depth. Where the soil was not fertilized, the crop dried out the soil to a lesser depth. It left the equivalent of 4.5 inches of water in the upper 3.5 feet. On the unfertilized corn, which took 14

inches of water from the soil, the yield was only 18 bushels per acre. It required 26,000 gallons of water to make a bushel of corn. On the fertilized soil with a yield of 79 bushels, only 5,600 gallons of water per bushel were required. The drought was a case of plant hunger rather than thirst.

This was a clear demonstration that the soil is a factor in the drought, not through differences in the stored water in this case, but rather as it represents fertility by the management of which the specific supply of rain water can be made to yield so much more in crop returns. It suggests the possibility of more fertility to greater depths of the soil as the way to use stored water more efficiently. We need not only to store water to greater depths but to store fertility to such depths also. The drought drying the soil down to 42 inches and spending 16 inches of stored soil water to give 79 bushels of corn certainly would be considered much less of a "disaster" or of an "agricultural emergency" than the drying of it to only about 36 inches and spending 14 inches of soil water but getting only 18 bushels for that cost in water. Unfortunately, the rainfalls after the drought of the summer of 1953 and before the summer of 1954 were not sufficient to restore the moisture in the soil to those depths of its previous drying. As a consequence, the drought of 1953 carried over into the succeeding year.

Corn Plants Making No Grain On Infertile Soil Showed No Visible Injury By The Heat Waves

During the drought of 1954 the different levels of soil fertility represented by the plots on Sanborn Field suggested forcefully that the drought may be injurious to plant processes because of high temperatures. It suggested also a more severe injury to plant tissues according as the higher soil fertility represented more actively growing plants.

Where corn has been grown continuously since 1888 with crop removal and no soil treatment, the plants remained greenest of all corn plots on the entire field. Only the lower two leaves on the stalks were "fired." The other eight leaves, though much rolled, showed no irregularities. The stalks were tassled but were without shoots. One would say it was about the customary "short" crop which that plot has been growing regularly now for many years.

On the adjoining plot where six tons of manure per acre have been used annually, the much taller and heavier stalks had the lower five leaves badly "fired." The remaining six leaves were rolled. But they were not visibly

injured. The stalks were well tasseled. The plants were without shoots, suggesting no grain production.

On the nearby plot where heavy crop residues were turned under and the soil given full fertilizer treatment—including nitrogen—only a single lower leaf was "fired." The other 13 or more leaves were closely bunched on the shortened stalk. The tassel had not emerged. There were no shoots or signs of ears. More significant, however, was the observation that the leaves were badly bleached from their tips back to almost their mid-length. This part of the leaf tissue was dead. Save for its widely different appearance, the damage took a pattern suggesting the same leaf area involved when the plant suffers from nitrogen deficiencies in the soil. It suggested death in the area where the extra nitrogen was involved in growth rather than where there was a deficiency.

When the more vigorous plant growth for seed production involves more physiological functions, it seems reasonable that high temperatures might be more disturbing to the living processes centered in the expectably higher protein content of the cells than to those in plants growing less vigorously and doing little more than making the minimum of carbohydrates, like starch and cellulose. Processes of growth and life are activated by enzymes, compounds resembling proteins in some respects. They are decidedly thermolabile, or are killed by temperatures going above 45°C or 113°F. The proteins of vigorously growing plants may not be so widely different in their responses to high temperatures than are fertile eggs under incubation. Eggs give a good hatch when the temperature is held at 100°F. But a few hours of 10°F. above that temperature will ruin the hatch even if the egg protein is not coagulated or even coddled. No visible signs of injury are recognized until the egg really dies and processes of change or decomposition have had time to give their evidence. The death of the corn leaf under the high temperature of heat wave suggests a close similarity, and time is required for the disturbed plant metabolism to indicate itself as may be suggested by accumulation of nitrates to the danger point as poison for animals consuming the green fodder. One may well be reminded that crops growing in the tropical heat are not high producers of protein.

Droughts are disasters to crops because they are more than shortages of water per se. They are disasters because they are (a) shortages of soil fertility and (b) excesses of temperature.

When they are the latter they represent little that we can do to offset the damage. As the former, or shortages of fertility, their disasters are not necessarily mitigated if we merely apply water. Soils made both deeper in structure required for water storage, and more fertile also to the depth, will lessen the damage in the drought years but will also give bigger yields in years of no drought. When once we appreciate the soil as a factor in the drought, then we can use the years of no such damage to build the soil fertility for less of disaster from the drought when it occurs. Fertility is the major means of managing the soil to mitigate drought damage, and to give bigger returns in crops also when there is no drought.

USDA Steps Up Program Against Brucellosis

Secretary of Agriculture Ezra Taft Benson has directed the Agricultural Research Service to proceed with an accelerated program to eradicate brucellosis (Bang's disease) in cattle.

Under legislation approved last August, USDA is authorized to transfer annually, for a two-year period, funds not to exceed $15,000,000 from the Commodity Credit Corporation to Plant and Animal Disease and Pest Control, to accelerate the brucellosis eradication program. The legislation makes it possible to return to the former level of federal indemnities for reacting animals that was in effect prior to September 1953. This payment cannot exceed $25 for grade animals and $50 for pure-bred animals, nor exceed one-third of the owner's loss: Indemnities are paid only if reactor animals are promptly removed from the herd, and the herd handled in accordance with the approved program.

The Agricultural Research Service now has cooperative brucellosis eradication agreements with 48 States and 2 Territories. Under the control and eradication program started in 1935, the incidence of brucellosis in dairy and beef cattle has dropped from 11.5 per cent in 1934 to 2.6 per cent in 1954. Plans now call for a stepping up of cattle testing to locate diseased animals. The development in recent years of the milk ring test enables officials to test dairy cattle more rapidly and at lower cost. This test serves as a screening device whereby milk or cream samples from a single herd can be tested to determine whether there are infected cattle in the herd. Another important phase of this program, calfhood vaccination, will be expanded also.

West Virginia Agricultural Extension Service

Mahon's Beef Oasis

This Nebraska rancher has worked out an excellent system of range management. . .

Condensed from Nebraska Farmer

Carl Deitmeyer

W. H. (Bill) Mahon, north of Haigler, Nebraska, has found a key that has turned his sunburned acres into an "oasis."

The first time Mahon saw Dundy county was in 1909. Since then he has struggled endlessly through several drouth periods. Bill soon decided that raising row crops in his area "was strictly for the birds." He liked the advantages of grassland farming— less labor, less cash outlay, better control of soil and moisture and more cattle.

Bill knew he had water around him. There was Buffalo creek running through his place. Nearby were two springs. And there was water down-under. Adjacent to Buffalo creek was a pasture that was sub-irrigated by a sheet of water. Lush grass grew there and it always looked like an oasis.

What Mahon saw he liked. Soon he started to piece his present grassland management program together. He has 2,680 acres of land including some school land to work with.

Dundy county agent Leo Barnell liked what Bill was attempting to do so he supplied him with two pounds of very scarce sandlove grass seed. That was eight years ago. This grass now covers 468 acres; eight acres of which is used for certified seed production. Mahon has cut hay and harvested seed from a part of his acreage but grass provides his big production.

Roaming over the hills and oasis are 330 head of grade Herefords.

Mahon enthusiastically declares that beef production from sandlove grass is about four

Reprinted by permission from Nebraska Farmer, Lincoln Nebraska, November 6, 1954.

times as good as native pastures in dry years. And the dry years far outnumber the wet in his area, he points out.

His grass management records show: In 1953, 40 head of heifers ran on the 360 acres of sandlove and 170 acres of native pasture —all in one large field. These cattle were on grass until July 1. They were removed and replaced with 65 head of steers. These stayed until October 15. Then the steers were taken off and 90 head of cows grazed the pasture until March 15, 1954. A month later, April 15, 88 steers were turned in and grazed all summer.

The steers were sold recently. Bill's records show the sandlove pasture produced 24 thousand pounds of beef in 150 days. This figures more than 1¾ lbs. per steer per day. And there remains a lot of grass for the cows this fall and winter.

Even with the best of grass, Bill warns, a rancher should watch his pastures so they never become over-grazed.

Irrigation System Installed

To place another hobble on ole' man drouth, Mahon installed an irrigation system to water his 85 acres of alfalfa.

The well is 60 feet deep, and spews a 500 gallon a minute stream. A diesel engine supplies the power. His sprinkler system contains 1,880 feet of pipe with 10 jets capable of throwing 50 gallons of water per minute.

Mahon's complete system cost him about $8,000. It's already paying off, he says, and this is only the second year of operation.

Alfalfa production runs about three tons per acre. When needed the growing legume is given an application of phosphate at the rate of 90 lbs. of the active chemical per acre.

Bill feels that his irrigated alfalfa provides him with a terrific crop insurance program. He also raises sorgo that has been yielding eight tons to the acre. Norcan has been his best variety. He raises this camel crop on a portion of his alfalfa ground.

The Mahon's have an attractive farm home in a very picturesque setting.

Bill dammed two ponds on Buffalo creek. He also constructed several reservoirs which are spring fed. A large picture window in the house frames a view of the ponds with the green pastures in the background.

These four ponds abound with fish. Bill allows fishing only by permission, and then with artificial lures. The ponds have been stocked with Rainbow and Brook trout; bullheads; Rock Bass, Blue Gills and Crappies.

The daughters are active in 4-H club work. Phyllis is attend-

ing Colorado A & M college this year for the first time.

Bill's lawn and backyard is a landscape specialist's dream. A ram-type pump which operates under water pressure from one of the spring-fed ponds sprays out two-gallons of water per minute which keeps the landscaped greensward in fine condition.

A mixture of five lbs. of iron sulphate and five lbs. of ammonia sulphate applied to each one thousand square feet of lawn—spring and fall—feeds the blue grass. And it's Mrs. Mahon's "green thumb" that keeps the flowers coming on from early spring to fall.

Mrs. Mahon, besides being a very busy homemaker, finds time to work in county home economics activities. She is also president of the Haigler Garden Club.

When Bill isn't farming or ranching, fishing or hunting, he's reading. His basement library is filled with agricultural bulletins.

Farm Records Help Figure Income Tax

At income tax filing time, farmers with a good, accurate set of records are going to find themselves in pretty good shape to figure their tax.

But farmers that use the hit-or-miss method of record keeping are in for the usual amount of trouble. That word of warning is sounded by E. M. Elwood, Michigan State farm management specialist.

Elwood notes that there are more changes than usual for filing the 1955 returns. He lists some of these changes that will affect farmers:

One change is the filing requirement for persons over 65—they need not file unless their gross income is $1200 or more for the taxable year. Those under 65 must file with an income of $600 or more.

This year children under 19 can be listed as dependents regardless how much they earn, if the parents provide over half their support.

The tax law—recently rewritten—gives relief to families hit hard by medical and dental bills. They are allowed deductions on these expenses that amount to over 3 per cent of their gross income. Last year they could deduct only an amount that exceeded 5 per cent.

Michigan Extension Service

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New Tractors and Tillage Tools

FROM OVERSEAS

If you have an idea that farming across the Atlantic ocean is performed with ancient hand tools, you are in for a surprise the first time you look through an English or Continental farm magazine. The ads will describe new and interesting farm machines you have never seen before.

In spite of this apparent evidence of highly mechanized agriculture, European travelers will tell you there is a great deal more tedious hand labor performed there than in this country. Apparently, some farms use modern machinery and methods while many others, especially the small holdings, are operated much as they have been for a hundred years.

In England and Germany, the extensive lines of farm machinery, like their automobiles, are designed and manufactured for export as well as local sales. Manufacturers offer such interesting machines as combines with baling attachments, mow hay dryers, power silage cutters, silage balers, tractor powered hedge trimmers, prefabricated concrete pit silos, mole plows for laying plastic water pipe, and air-cooled diesel engines down to 1½ h.p.

In tractors, there's a great variety, largely diesel. The new four-wheel drive model illustrated above is new. Built by a manufacturer of crawler tractors, it has clutch and brake steering and no steering wheel. Ground gripping ability and high power output almost equal to a crawler is combined with the speed and mobility of a wheel tractor, according to the manufacturer.

Rumors say a new four-wheel drive soon will be introduced in this country. It may be very like this English model.

The Lanz "Alldog" Tool Carrier illustrated at left, is built in Germany. With long horizontal tool bars and a diesel engine, it is convertible into an impressive number of self-propelled farm machines. Everything from a wagon box to vegetable seed attachment is available and quickly attached, it is claimed.

There is no reason to believe that our own implement companies are lagging. Some of the most prominent advertisers in the English farm papers are American firms. In fact, the manufacturer of the silage baler mentioned above is our own International Harvester.